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**AN ANALYSIS OF THE HIDDEN COSTS OF COMPETITION IN THE
PROCUREMENT OF SPARE PARTS AT THE NAVY SHIPS PARTS
CONTROL CENTER: A FRAMEWORK FOR PROCESS IMPROVEMENT**

by

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ADVANCED RESEARCH PROJECT CERTIFICATION

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CONTROL CENTER: A FRAMEWORK FOR PROCESS IMPROVEMENT

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paper is substantively acceptable, and that this manuscript is free
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Abstract of
AN ANALYSIS OF THE HIDDEN COSTS OF COMPETITION IN THE
PROCUREMENT OF SPARE PARTS AT THE NAVY SHIPS PARTS
CONTROL CENTER: A FRAMEWORK FOR PROCESS IMPROVEMENT

The highly publicized spare parts overpricing scandals of the early 1980s set the stage for legislative and Service-driven measures to ensure increased employment of competitive acquisition strategies. This study will show that competition, while producing well advertised successes, has become an end and not a means to improving the acquisition of spare parts and components at the Ships Parts Control Center (SPCC). The result of this scenario has been numerous, sub-optimal, short-term decisions in favor of competitive awards and the consequent accrual of significant hidden costs. This analysis provides background on the pro-competition climate set by the procurement scandals of the 1980s. It then explores the concept of the inherent differences between the commercial and defense markets; illustrating how the intrinsic benefits of competition are often inapplicable at Defense procurement activities such as SPCC. The study then shows how the competitive procurement practices at SPCC are directly opposed to the TQM principles of customer focus, eliminating inappropriate goals and quotas, barriers between departments and awarding contracts primarily on price. Once the groundwork is laid by this general analysis, the study then thoroughly details the hidden costs of competition to include the obscured costs of integrated logistics support (ILS), procurement lead time delays, contract administration, and exigency buys. Numerous examples are provided from SPCC procurement histories to portray these costs of competitive awards. A final chapter is then provided to reflect the perspectives of major defense industry executives on the effect of competition on the acquisition of Navy spare parts. Finally, summary conclusions and recommendations are provided in order to improve the acquisition of spare parts at SPCC.

Specifically, recommendations are structured to integrate the maximum potential benefits from competition with smart long-term business decisions; thereby supporting the best economic and readiness interests of the Navy.

Executive Summary of
AN ANALYSIS OF THE HIDDEN COSTS OF COMPETITION IN THE
PROCUREMENT OF SPARE PARTS AT THE NAVY SHIPS PARTS
CONTROL CENTER: A FRAMEWORK FOR PROCESS IMPROVEMENT

Background and Results in Brief.

The highly publicized spare parts overpricing scandals of the early 1980s set the stage for legislative and Service-driven measures to ensure increased employment of competitive acquisition strategies at both the system and spare parts levels. This study will show that competition, while producing well advertised success stories, has become an end and not a means to improving the acquisition of spare parts and components at the Ships Parts Control Center (SPCC). The result of this scenario has been numerous, sub-optimal, long-term decisions in favor of competitive awards and the consequent accrual of significant near and long-term hidden costs.

This analysis provides background on the pro-competition climate set by the procurement scandals of the 1980s. It then explores the concept of the inherent differences between the commercial and defense markets; illustrating how the intrinsic benefits of competition are often inapplicable at defense procurement activities such as SPCC. The study then shows how the competitive procurement practices at SPCC are in conflict with the TQM principles of customer focus, eliminating inappropriate goals and quotas, removing barriers between departments and not awarding contracts primarily on price. Once the groundwork is laid by this general analysis, the study then thoroughly details the hidden costs of competition to include the obscured costs of integrated logistics support (ILS), procurement lead time delays, contract administration, and exigency buys. Numerous examples are provided from SPCC procurement histories to portray these costs of competitive awards. A final chapter is then provided to reflect the perspectives of major defense industry executives on the effect of competition on the acquisition of Navy spare parts.

Summary Conclusions and Recommendations.

The following are the summary conclusions and recommendations provided as a framework to improve the acquisition of spare parts at SPCC. Specifically, recommendations are structured to integrate the maximum potential benefits from competition with smart long-term business decisions; thereby supporting the best economic and readiness interests of the Navy.

CONCLUSIONS

Conclusion #1: Notable cost savings were achieved through the competitive procurement of spare parts, especially in the breakout of spare parts business from prime contractors and in competing items that were either Navy designed or for which solid data packages existed. Notwithstanding these advantages, the competition pendulum swung too far. Data from Price-fighters reveals that the overpricing scandals were overplayed. Numerous examples in this study have established that the short-term cost savings figures accredited to competition are severely overstated when the long-term, hidden costs are considered.

Conclusion #2: The business environment at SPCC and other DOD procurement activities is markedly dissimilar to that of the commercial market. To compare the potential and real effects of competition in these widely differing sectors can induce faulty business decisions.

Conclusion #3: The manner in which SPCC approaches the use of competition as an acquisition strategy is in conflict with the principles of TQM/L. Specifically, the lack of customer focus, the setting of sub-optimal goals and quotas, barriers between departments, and awarding contracts primarily on price are all anti-TQM practices that hinder good, long-range, business decisions.

Conclusion #4: The environment described in the first three conclusions has set the stage for accumulating huge hidden costs associated with competitive buys. It starts with inadequate calculations of prospective costs and savings that are derived from a standard competition algorithm which decides those items that should be procured competitively. The process continues with the actual competitive award when the obscured costs of ILS, procurement lead time delays, contract administration and exigency buys are acquired. Representative cases in Chapter V reveal that these costs can range from hundreds to millions of dollars.

Conclusion #5: No "cookbook" acquisition strategy will fit every procurement. The benefits of competition must be used in consonance with sound, long-range business decisions. The spare parts and components sensitive to ILS costs must be identified and considered early in the procurement process, especially on performance specification material. These costs include such factors as provisioning, stock number maintenance, and training.

Conclusion #6: The risk of non-performance by first-time, competitive manufacturers must be reduced.

Conclusion #7: The Navy and SPCC need to develop an acquisition process that allows more intelligent and adaptable procurements. The cost factors of downstream ILS support,

increased contract administration, and the risk of non-performance must be a key ingredient of the solicitation and award process when evaluating a competitive procurement. The FAR allows the discretion to make this happen and top DOD/Navy leadership have made clear statements that support this objective. Nonetheless, Navy leadership can not have it both ways since more flexibility implies the relaxing or elimination of constraints such as business plan goals for competition.

RECOMMENDATIONS

Recommendation #1: The competition/breakout algorithm must be overhauled. It needs to more accurately estimate the prospective costs and savings from competition. The model needs a more comprehensive calculation of the hidden costs described in the conclusions and comprehensively identified in Chapter V. The potential savings side of the algorithm needs to have a better estimator than a blanket 25 percent figure. Historical annual demand figures, which form the basis for potential savings, are highly volatile. They should be re-evaluated based on current requirements and demand forecasts so as to validate the potential savings from competition.

Recommendation #2: The spare parts and components that are sensitive to ILS costs should be coded as ILS sensitive during the provisioning process. A perfect window for implementing this recommendation now exists since the program by which the HSC's transmit provisioning technical data, called Interactive Computer Aided Provisioning System (ICAPS), is now being updated. An ILS sensitivity code would allow SPCC to identify these types of components in an automated fashion and take the appropriate action to consider hidden costs in competitive awards.

Recommendation #3: SPCC requirements generation and contracting activities must develop the appropriate acquisition strategy to allow the suitable of competition while also ensuring that long-term hidden costs are considered. This requires a TQM/L approach. First, the barriers between the requirements and contracting codes at SPCC must be removed by merging the organizations. This action will have multiple benefits, but most importantly, it will allow the development of acquisition strategies for ILS sensitive procurements. Secondly, the goals for competitive and small business awards should be removed. Recognizing that some laws may have to be modified and the difficulty involved therein, NAVSUP at least has the ability to modify competition goals for SPCC.

Recommendation #4: A current and maintainable model must be developed to accurately calculate the hidden costs of ILS. The NAVSEA model is not based on current statistics or studies and would not sustain the scrutiny of an audit or a contract protest. This model, which should be a joint NAVSUP/HSC project, would then be used as the basis for clauses in contract solicitations. Samples are provided in Appendix IV.

Recommendation #5: To reduce the risk to the Navy on contracts involving first-time

competitors, some teeth must be put into the pre-award survey process by stronger evaluations of the responsibility and capability of manufacturers to perform. The resources to perform this function should come from the huge resources applied to the contract audit function. The return on investment in arresting post award hidden costs would be much higher when applied in this arena.

Recommendation #6: If a company has been a proven performer then that performance should be rewarded with future business. NAVSUP needs to work to eliminate the barriers to procurement activities that prevent them from making long-term, option oriented awards. Such barriers include the requirement to perform market surveys before exercising options on contracts.

Recommendation #7: The hidden cost lessons-learned from spare parts procurements must be applied to the future DMRD initiative to compete repair business. Not only will all the points of this study be applicable, but the unique DLR hidden costs involved with carcass tracking and technical repair standards will be immense.

Recommendation #8: In order to implement the aforementioned actions, an SPCC TQM/L Process Action Team (PAT) should be established. This team should be comprised of personnel from all the concerned disciplines at SPCC; to include inventory managers, procurement technicians, buyers, and contract administrators.

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AN ANALYSIS OF THE HIDDEN COSTS OF COMPETITION IN THE PROCUREMENT OF SPARE PARTS AT THE NAVY SHIPS PARTS CONTROL CENTER: A FRAMEWORK FOR PROCESS IMPROVEMENT

CHAPTER I

INTRODUCTION

The Problem. The overpricing procurement scandals that occurred in the 1980's have led to greater regulation of competition in procurement of government goods and services. Specifically, the passage of the Competition in Contracting Act (CICA) in 1984 and a litany of other legislative acts have led to numerous Department of Defense (DOD) and Navy regulations and guidelines in support of competitive procurements. All of this guidance has been applied at both the system and spare parts levels of acquisition. The application of competitive procurement advocacy and strategies has brought about some remarkable success stories and dollar savings, but the unadvertised issue of both recurring and nonrecurring hidden costs is often neglected in the zeal to foster competition. The unfortunate result has been a mentality and process that is designed to save money through competition, but ignores many factors that should be included in a good business decision. As one program manager at the Navy Ships Parts Control Center (SPCC) so aptly described the situation, "We will attempt to save money through competition no matter how much it costs us".¹

Focus of Study. This analysis will focus on the hidden costs of competitive procurements of spare parts at the Navy Ships Parts Control Center (SPCC), but it certainly has applicability

¹Interview with Gregory Frankford, Program Manager for Auxiliary Systems, Ships Parts Control Center, Mechanicsburg, PA: 17 December 1991.

at other service buying centers. The hidden costs of competition occupy a wide array of categories. The qualitative issues of competitive acquisition will be briefly examined in this study, but the major emphasis will be on analyzing the SPCC competitive process in terms of getting the best economic value when buying spare parts and components. In other words, what is the best long term business decision when making a spare parts contract award in a competitive environment?

Framework of Study. Before delving into the specific, problematic, details of competitive procurement hidden costs, a foundation for examining the problem must be developed. Chapter II will provide a brief history of CICA, the bureaucracy that evolved out of CICA, SPCC competition goals, and other impacts of competition advocacy. Chapter III examines the inherent differences between the forces of competition in the U.S. commercial industrial sector versus the forces at play in the DOD/SPCC market. Specifically, this chapter addresses the unique pressures that influence the SPCC contracting officer that are not applicable to a commercial buyer. The purpose for Chapter IV finds it's roots in the DOD efforts to utilize the proven benefits of Total Quality Management (TQM) in the military services. This chapter will show that the manner in which SPCC effects competitive procurements is in conflict with TQM principles and that the process is ripe for the application of the TQM philosophy so as to maximize the suitable benefits of competition. The SPCC-specific problems with competitive procurements is examined in Chapter V which will provide a lessons-learned foundation for process improvement. Chapter VI is the defense contractors perspective on benefits and problems with competition for SPCC spares procurements. Finally, Chapter VII will offer some summary conclusions regarding the use of competition in procurement and offer

recommendations for improving the process at SPCC.

Research Impact. This research utilizes the principles of TQM as a common sense guide to thoroughly examine the SPCC competitive process and offers recommendations that can fully exploit the benefits of competition while also making procurement decisions that are in the best long term economic interest of the Navy. SPCC will spend approximately \$477 million buying spare parts and components in fiscal year 1992. The impact of the recommendations contained in this study will be the ability to conserve significant, long-term, fiscal resources in an era that promises downsizing of the Defense budget.

CHAPTER II

HISTORICAL BACKGROUND OF COMPETITION IN DOD PROCUREMENT

Evolution of Competition in DOD. Before the hidden costs of competition can be adequately examined, the background and environment of competition in DOD must be briefly portrayed. The concept of making greater use of competition in the procurement of DOD material is not a novel idea. Procurement reform initiatives date back to the 1940's and 50's. More recently, in 1969, the Commission on Government Procurement was formed and initiated some serious efforts to forge procurement policy throughout the 1970's. All of these executive-level ventures failed to achieve greater levels of competition despite many initiatives in this area.² The environment in DOD procurement offices, for the most part, did not support the use of competition as an acquisition strategy. Congressman Bill Nichols accurately described this period in DOD procurement when he stated, "People were not looking at benefits of competition, like reduced price, better quality, etc., because the system fostered an environment penalizing one for pursuing competition. It was safer and less time-consuming to execute a sole-source contract than to go competitive."³ Incentives and goals for contracting officers of both major systems and spare parts procurements in this era were primarily centered around time and readiness measures of effectiveness. The media-grabbing procurement scandals of the early

²Eugene E. Kluter, "Procurement Reform: A Process Out of Control," Executive Research Paper, The Industrial College of the Armed Forces, Fort McNair, DC: 1987, p. 33.

³Bill Nichols, "Procurement Reform Initiatives: Competition," Program Manager, July-August 1988, p. 38.

1980's served to rapidly change this situation.

Impact of CICA. The Congress of 1984, ever-sensitive to media attention, saw the overpricing scandals as an opportunity to not only correct the lack of competition in procurement, but also a vehicle through which to promote a variety of special social interests such as small and minority-owned businesses. The passage of CICA and related legislation often had the best of intentions. However, a myriad of DOD and Service-imposed regulations had the effect of lockstepping the process and swinging the pendulum too far in favor of competition. Specific examples will follow in later chapters to substantiate this viewpoint. In an effort to curb the negative impact of overpricing, then Secretary of Defense, Casper Weinberger, issued a ten-point program in July 1983 and then twenty-five additional actions in August 1983 to ensure that the Services would not be plagued with pricing abuses in the future. The actions included such proactive measures as the use of competition advocates, reform of basic contract procedures, and the implementation of the DOD Replenishment Spare Parts Breakout Program.⁴ The impact of this strong, higher level, guidance at the buying agency level, specifically SPCC, will now be examined.

Competition Advocacy at SPCC. In the middle to late 1980's competitive procurement advocacy and goals reached a zenith at DOD acquisition activities, including SPCC. This process included the creation of a separate Competition Advocate/Technical Breakout Department at SPCC. This department's primary purpose was to remove most barriers to competition and to achieve the competition goals established in conjunction with the Naval

⁴Memorandum from Caspar W. Weinberger to Secretaries of the Military Departments, 29 August 1983.

Supply Systems Command. The SPCC Competition Advocate (CA), a GM-15 federal service position, had broad authority to take all actions to achieve these goals.

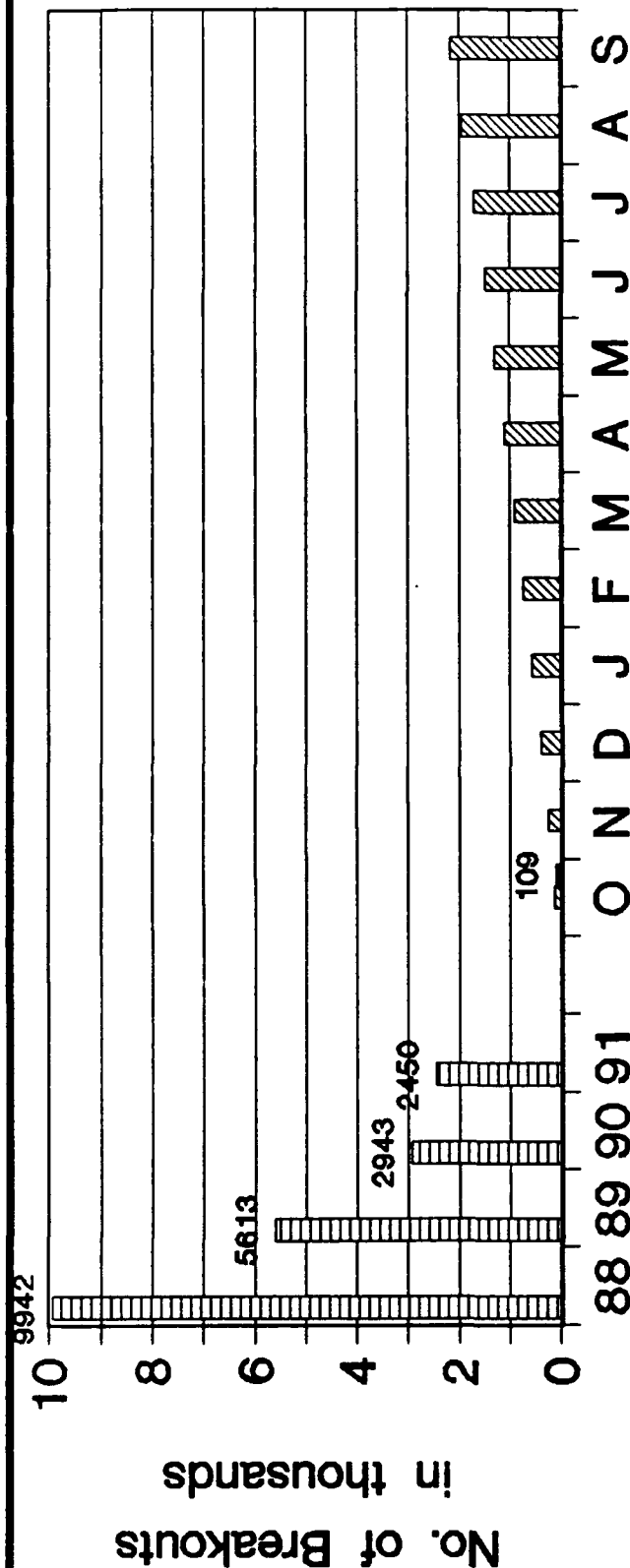
The goals established in support of competition were by no means insignificant. The targets were anywhere from 30 to 45 percent of procurement dollars aimed for competitive buys. The most recent SPCC annual business plan goals target 41 percent of funds for competition in fiscal year 1991 and 44 percent in fiscal year 1992.⁵ This goal is actively pursued by the SPCC Contracting Group. Additionally, the Competition Advocate department has always sustained ambitious annual business plan goals for "breakout" of procurements and other dollar savings measures (termed "cost avoidances" by CA's). The term "breakout" describes a broad program to open items of supply to competitive procurement thus achieving cost avoidance. It includes such measures as buying the required technical data, making purchases from the original equipment manufacturer (OEM) vice the prime contractor, and using performance specifications vice strict specifications or build-to-print. Figures (1) and (2) illustrate the fiscal year 1992 business plan goals and tracking system that are the responsibility of the SPCC Competition Advocate. Figure (1) shows the number of items made fully competitive by breakout actions versus a goal and figure (2) represents the tracking of total dollars saved as a result of breakout/cost avoidance versus a goal.

The efforts of the Competition Advocate department at SPCC advertised remarkable savings attributed to competition. In fiscal year 1988 alone, the Breakout program took credit for \$29,201,613.85 in cost avoidances by comparing newly awarded contracts to previous prices

⁵Ships Parts Control Center Management Information System Package, Business Plan Goals, Mechanicsburg, PA: 1991, p. 15.

FIGURE 1

Full Screen Breakouts



92 Plan 92 Actual

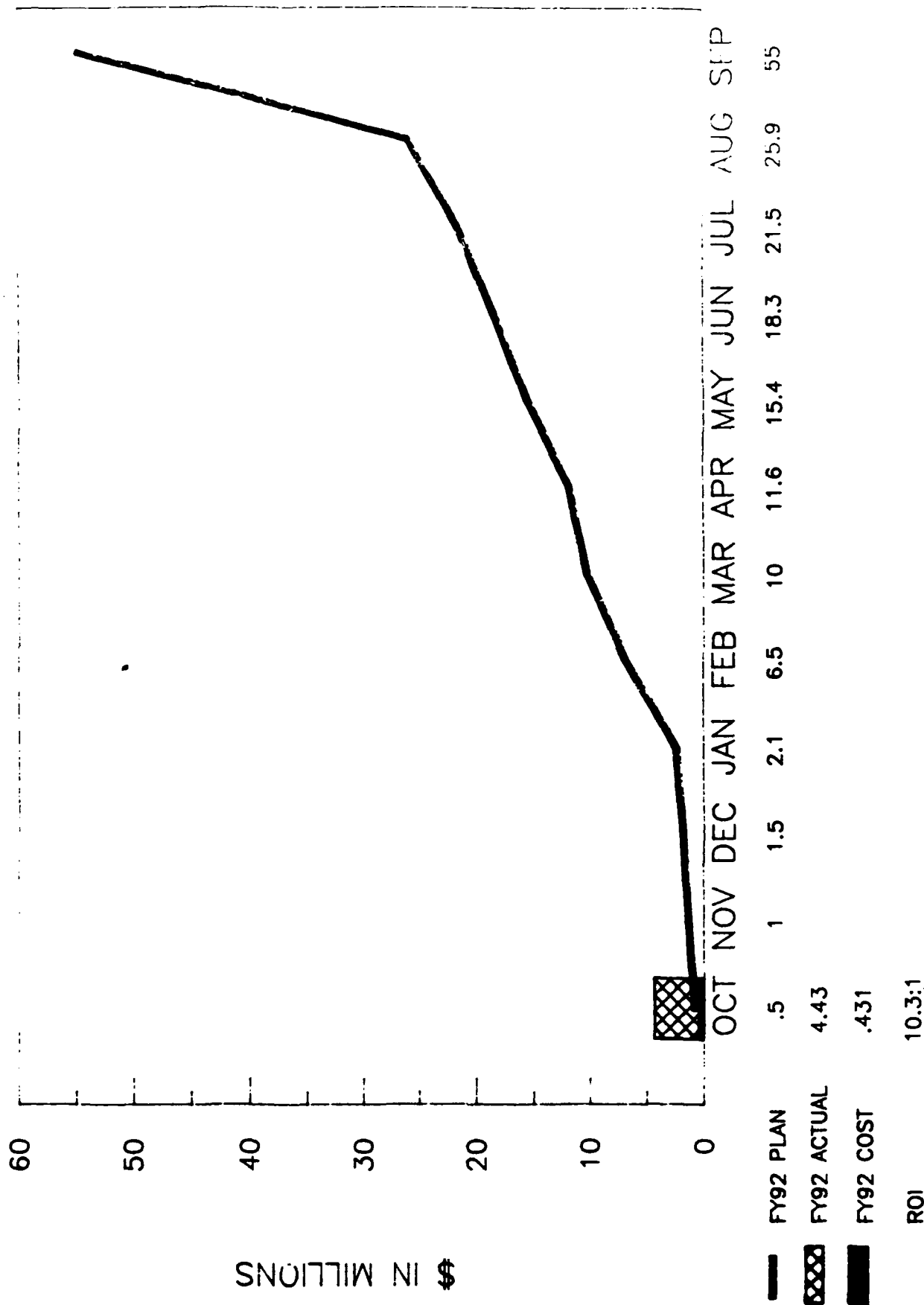
	O	N	D	J	F	M	A	M	J	J	A	S
92 Plan	120	256	407	568	730	907	1,089	1,286	1,490	1,708	1,938	2,175
92 Actual	109											

Responsible Code: 056
ABP Goal: 2,175
MR 23

Source: Ships Parts Control Center, Management Information Systems
Data, Mechanicsburg, PA: October 1991.

FIGURE 2

BOSS COST AVOIDANCE



Source: Ships Parts Control Center, Management Information Systems
Data, Mechanicsburg, PA: October 1991.

ABP GOAL: \$55M

paid under a sole source climate.⁶ Even as the remainder of this analysis will show that numerous hidden costs are not accounted for in these figures, one can certainly not discount the magnitude of fiscal benefits derived from the active use of a competitive acquisition environment. The successful efforts to purchase spares from the OEM vice the prime contractor thereby avoiding the added overhead charges are certainly noteworthy.

The goals and resultant savings described above were all intricate elements of the climate the Navy sought to create on the heels of the spare parts overpricing scandals. The tone set for this environment is best illustrated by some excerpts from a Naval Supply Systems Command letter to all field activities which states,

"...the need to report cost avoidances achieved to NAVSUP as 'Good News', to ensure we are taking full credit for our achievements in spare parts procurement reforms. Cost avoidance generated by our efforts is a key measure of our achievements. A high return on investment is critical, not only to maintaining our creditability with Congress but to ensure a continued flow of resources in a tight budget climate."⁷

The background presented in this section was necessary to show why DOD and its procurement activities, such as SPCC, were incentivized to vigorously pursue competition in the procurement of spare parts. This competition advocacy environment produced well-advertised successes and tangible savings, but many hidden costs were incurred. Before specifically probing these costs however, the next two chapters will first explore inherent problems with competition strategies in DOD procurement and the incompatibilities between the application of competition and TQM

⁶Ships Parts Control Center Competition Advocate data files, Mechanicsburg, PA: 9 December 1991.

⁷Letter from Commander, Naval Supply Systems Command to Field Activities, 25 June 1986.

at SPCC.

CHAPTER III

COMPETITION IN DOD/SPCC VERSUS THE PRIVATE SECTOR

Is DOD a Free Market? The advocacy of competition described in the previous chapter has led to a mind set that implies that if the government competes a requirement for spares procurements, there will automatically be savings accrued. During the hearings leading to the passage of CICA, a comment by Senator John Towers best embodies this sentiment, "Competition is at the very heart of our American economic system. In many ways, it is to economic freedom what free expression is to political freedom."⁸ The fallacy in these ideas lies in the differences between the defense and private sector marketplace. Appendix I was developed by Jacques S. Gansler to demonstrate the differences between the free and defense market. Although some of the differences are more applicable to end item and major systems acquisitions, a majority are perfectly relevant to many spares and component procurements. Particularly apropos are the points in the appendix dealing with the number of buyers (one in DOD), reverse effects of demand, and the barriers to entering the defense market. The drive to use competition has often ignored many of these factors, resulting in the suboptimal employment of competitive strategies. In his research on this subject, Thomas E. Bruns provides an excellent synopsis of the situation when he states,

"We are all aware of the impact it (competition) has on reducing the price of goods and services that we purchase in the private sector. In my opinion, this

⁸Thomas E. Bruns, "Competition in Contracting Act: Free Market Illusion," Executive Research Project, The Industrial College of the Armed Forces, Fort McNair, DC: 1987.

strong faith has led to a misperception of the reality of competition in defense contracting--an illusion we must correct if we are to achieve the basic objectives established by Congress i.e., defense preparedness while conserving fiscal resources."⁹

How Much Competition does DOD Need? This is a tough question to answer in simple terms, but the real issue is whether DOD is promoting competition "for competition's sake". Again, referring back to overpricing cases which were the impetus for the strong fostering of DOD competition in procurement, one needs to ascertain whether the problem was really as glaring as the media reports would have the public believe.

Data from the Navy Price-fighters organization would seem to refute the opinion that the Navy had immense problems with getting a fair price for spare parts. The Navy Price-fighters is a group of logistics engineers established by NAVSUP to proactively find and investigate reported cases of overpriced spare parts. During the fiscal years 1986 to 1991 SPCC awarded 268,031 contracts for material. During this same time period the Price-fighters investigated 22,341 suspected cases involving SPCC stock numbers, of which 11,959 were found to be overpriced.¹⁰ This equates to 4.8 percent of the SPCC contract awards. Another point to consider is that even this percentage is undoubtedly overstated since SPCC contract awards may be for multiple contract line items or numerous stock numbers. Additionally, many of the cases investigated by Price-fighters included contracts prior to 1986, further overstating this percentage. Taking all this into account, an overpricing figure in the 3 to 4 percent range

⁹Thomas E. Bruns, "Competition in Contracting Act: A Free Market Illusion," Executive Research Project, Industrial College of the Armed Forces, Fort Mc Nair, DC: 1987, p. 1.

¹⁰Interview and Facsimile Data received from CDR George Foley, Officer in Charge, Navy Price-fighters Department, Norfolk, VA: 6 January 1992.

certainly does not parallel the purported magnitude of problems with Navy spares procurements as reported in the media and the popular sentiment held in Congress. The reason this point is critical is that this viewpoint was a key driver in championing increased competitive strategies.

Donald Pilling also questions the manner in which DOD applies competitive strategies in procurement when he states,

"The general conclusion that can be drawn thus far on all the purported benefits of competition in defense procurement is that few clearcut insights exist for policymakers. The most disturbing finding is that inasmuch as military departments are essentially in competition among themselves to see which of them can achieve a greater percentage of contracts awarded competitively, competition may have become the end and not a means. The Packard Commission recognized this issue when it stated, 'More competition, for example, is beneficial, but the mechanistic pursuit of competition for its own sake would be inefficient and sacrifice quality, with harmful results.'"¹¹

Defense contractors largely support this view as evidenced by the comments of Mr. James Fromfield, the president of the American Marine Machinery Association, when he asserts,

"As the Navy down-sizes the emphasis should be on quality and getting the most for the defense dollar. Additionally, with fewer requirements, the Navy business becomes a smaller piece of the defense contractors base. The question becomes whether competition is appropriate in this environment. Defense industries quickly learn how to game the system and hence you see the growth of distributors, replicators, and distribution houses in order to take advantage of competition rules. A small business that hires minorities, handicapped, and is located in an urban area on an Indian reservation holds all the trump cards in obtaining government contracts. The Navy is certainly not benefiting from this type of gamesmanship."¹²

¹¹Donald L. Pilling, Competition in Defense Procurement (Washington, DC: The Brookings Institution, 1989), p. 24.

¹²Interview with Mr. James Fromfield, Vice President, Leslie Controls Inc. and President, American Marine Machinery Association, Washington, DC: 13 December 1991.

The above comments illustrate why competition should not be viewed as a panacea to cure procurement problems. A short example will now show how competition is inappropriately forced on a procurement.

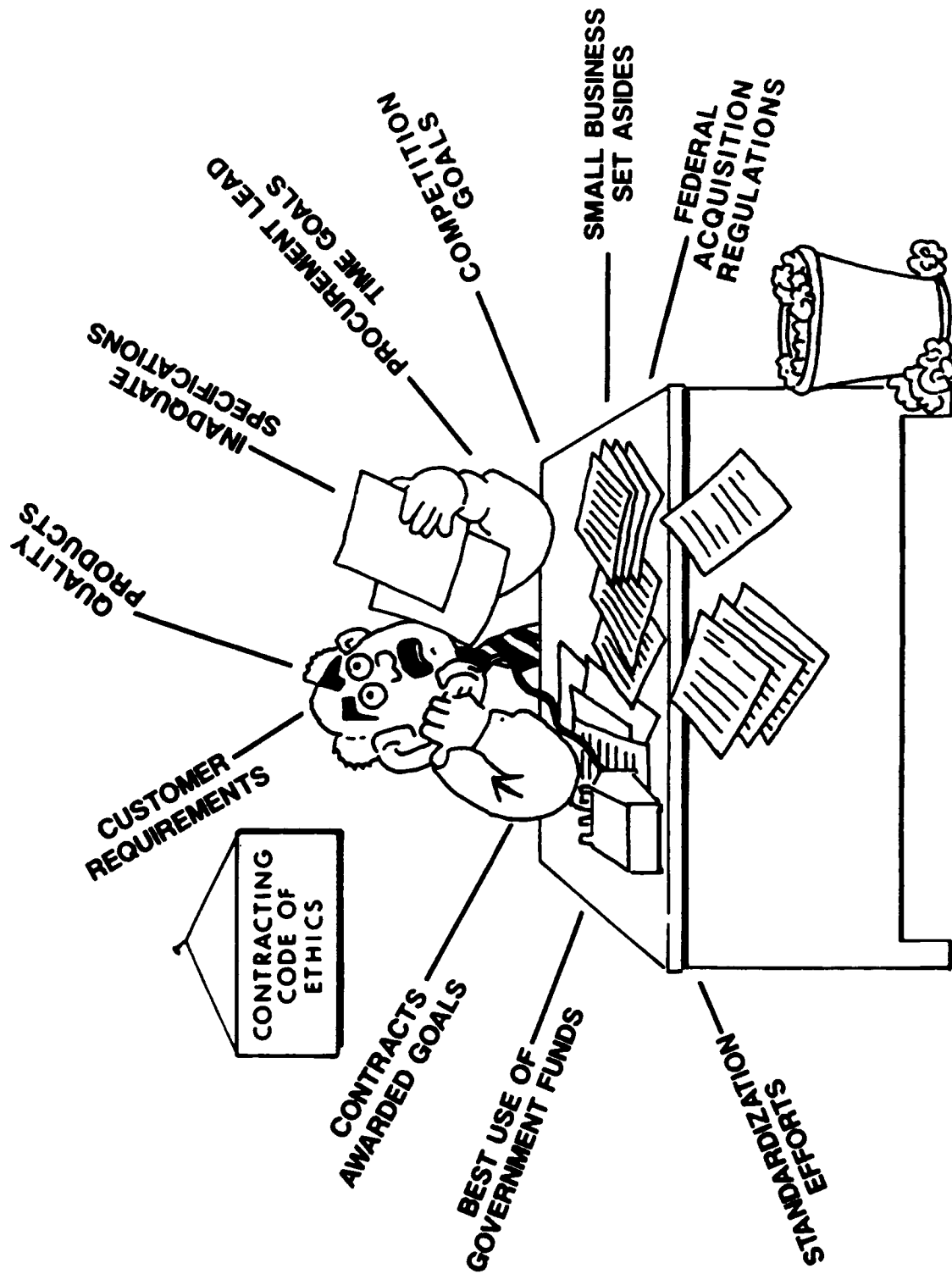
An example of the unsuitable application of competition is provided by a 1991 procurement of a Track Assembly (NSN 1440-00-864-1780) for a piece of electronics equipment. The requirement for the item was a quantity of one and since the item's cost/annual-buy-value was estimated to be greater than \$10,000, it was selected as a candidate and coded for competitive procurement. This assembly has always been manufactured by FMC Corporation and the data package consists of 5 and 1/2 inches of specifications and drawings. The specific hidden costs associated with this type of competitive procurement will be covered in detail in later chapters, but the most cursory, common-sense, examination of this case clearly demonstrates that competition for this item was not in the government's best interest. The costs to solicit and review proposals, survey and qualify new sources, not to mention all the future integrated logistics support (ILS) costs for a quantity of one track assembly make a competitive strategy a losing proposition. In this case no competition could be found in the marketplace, but the point to be made is that the system developed to promote competition is forcing a level of bad long-range business decisions. This small example demonstrates how competition is not always being used as the best acquisition strategy, but rather as the means to achieve a business plan goal. The next chapter will develop this idea further from a total quality management (TQM) perspective and demonstrate that the manner in which SPCC employs competition is not in alignment with TQM principles.

Conflicting Forces and Goals for SPCC Contracting Officers. One final issue in

discussing the inherent problems with competition at SPCC lies in the contending forces at play on SPCC procurement personnel. Figure (3) clearly illustrates that the chances for successfully meeting all the challenges directed at the SPCC contracting officer are minimal. Under the current environment, the path of least resistance for the buyer is to get the best price, do it quickly and to claim competition. These measures and goals are the basic report card for most procurement offices, but as the reader shall shortly discern, they often lead to a sub-optimal business decision for the Navy.

FIGURE 3

CONFLICTING CONTRACTING OFFICER CHALLENGES



CHAPTER IV

TOTAL QUALITY MANAGEMENT/LEADERSHIP AND COMPETITION

DOD Discovers TQM. Private industry, and more recently DOD, have recently embraced the business philosophy of W. Edwards Deming which he calls Total Quality Management (TQM). The Navy sees a renamed version of this philosophy, Total Quality Leadership (TQL), as a way to maximize readiness and get the most out of limited resources in the future. As Deming relates to the use of competitive procurement, all of his acclaimed fourteen points are not entirely pertinent. Of particular importance, however, are his thoughts concerning:

1. Doing business from a customer's perspective.
2. Eliminating numerical goals and quotas.
3. Ending the practice of awarding business largely on the basis of price.
4. Break down the barriers between departments.
5. Institute training on the job.¹³

These aspects will now be applied to the manner in which SPCC makes use of competition in procurement.

Customer Perspective. The emphasis on the customer is a keystone to the Deming principles. This certainly sounds like it should be the first commandment of any business and, undeniably, the procurement activities of the Navy, yet Deming points out the reality when he

¹³W. Edwards Deming, Out of the Crisis (Cambridge, MA: MIT Center for Advanced Engineering Study, 1986), p.20.

states, "... the evidence of the marketplace shows that many have become so sidetracked by short-term interests that even if they do have a long-term strategy it often lacks commitment from top management and is frequently undermined by contradictory policies and actions."¹⁴ When it comes to the buying of Navy spare parts, there are four separate navies involved; the engineers (Hardware Systems Commands), requirements generators (SPCC), Contracting and Competition Advocates (SPCC), and the fleet customer or user. Only if the activities of the first three are targeted towards the fleet customer's needs will the process succeed at an optimal level. The next chapter and its many examples will show that when it comes to competitive acquisition, this is often not the case.

Goals and Quotas. Andrea Gabor describes the detriments of goal-setting when she states, "An organization can usually achieve almost any objective it wishes to, in the short term, by paying a high enough price, including, in extreme cases, destroying the system itself."¹⁵ Deming provides an example that is perfectly analogous to the methods practiced in the buying of SPCC spares, and that is the U.S. Postal Service buyer who is rated on the basis of the number of contracts she negotiates during the year--the system clearly discourages complex, long-term agreements that might be in the better interest of the Postal Service.¹⁶ Clearly, this directly applies to the goal and quota practices of SPCC that were outlined in Chapter II such as requiring that 44 percent of the awarded dollars be competed. The short term savings of

¹⁴W. Edwards Deming, Out of the Crisis, (Cambridge, MA: MIT Center for Advanced Engineering Study, 1986), p. 22.

¹⁵Andrea Gabor, The Man Who Discovered Quality, (New York: Times Books, 1990) p.21.

¹⁶W. Edward Deming, Out of the Crisis, (Cambridge, MA: MIT Center for Advanced Engineering Study, 1986), p. 71.

awarding a contract to the lowest bidder can easily be overtaken by long term costs such as ILS and contract administration. This will be graphically illustrated in Chapter V.

Awards Based on Price. This principle, more than any other, is of key importance when analyzing the use of competition in buying spares. Deming emphasizes the development of single suppliers to industry and this idea is certainly worth consideration for DOD, but political reality will restrict how far this can be pursued when spending the public dollar. What is of importance is the various factors that should be considered, in addition to price, when making a spare parts contract award. As Gabor asserts,

"No system is more prone to producing waste than the Pentagon. Procurement regulations have come to virtually guarantee the delivery of shoddy goods by disproportionately favoring the lowest bidder, to the point that it has become virtually impossible for military personnel to justify purchases based on quality and long-term cost savings."¹⁷

These are strong words, but the problem can not be totally discounted. The causation however, is not so much the procurement regulations as the manner in which the Services have applied them. Even Congressional research has recently recognized some of the shortcomings of competition in acquisition, "Traditionally the emphasis has been on the procurement cost, and we have neglected the costs of maintenance, rework, repair, storage, and training."¹⁸ Examples will be provided, in Chapter V, from SPCC procurement histories to illustrate how, frequently, awards to the lowest bidder have yielded short-term financial gains, but generated

¹⁷Andrea Gabor, The Man Who Discovered Quality, (New York: Times Books, 1990), p. 273.

¹⁸House Republican Research Committee, Task Force on High Technology and Competitiveness, "Quality as a Means to Improving Our Nation's Competitiveness", 12 July 1988.

greater long term costs to the Navy and did not best serve the fleet customer.

Breaking Down Departmental Barriers and Training. Anyone who has been associated with a large, bureaucratic organization knows that barriers can exist between departments. These barriers can be caused by either policy or politics and often result in an organization not satisfying it's customers. Ford Motor Company has put forth great efforts to implement TQM, specifically focusing on breaking down inter-departmental barriers. Ford chairman Don Petersen refers to this process as "dismantling chimneys" and it involves the mobilization of individual corporate fiefdoms to cooperate on common objectives as defined by the customer needs and the company's improvement priorities.¹⁹ Bringing this idea to the Navy, dissolving the barriers, such as conflicting goals and objectives, between the Hardware Systems Commands (HSCs) and the various departments at SPCC should be the objective. More specifically, numerous barricades exist between the SPCC requirements generators (Weapons Systems Support Group) and the Contracting Group. The result is each part of the organization marching to a different drummer.

A simple example is found in SPCC's procurement of shipboard valves. The HSC's (NAVSEA) goal is to obtain a valve that is on the leading edge of technology, high quality, yet maintaining a high degree of standardization for maintenance and repair purposes. The requirements generator (SPCC item manager) desires a valve that is delivered on time and does not require management of additional sub-component spare parts. The SPCC contracting department will attempt to procure the valve in a competitive environment, at the best price, and

¹⁹Andrea Gabor, The Man Who Discovered Quality, (New York: Times Books, 1990), p. 24.

make the award in the least possible time frame. The fleet customer wants to order and receive a valve that exactly replaces its predecessor. The customer also requires that supply, maintenance, and all other logistics support is in place upon receipt of the valve. The above priorities, which are graphically demonstrated in Figure (4), create the setting for a myriad of conflicting internal goals and objectives. The result, in the case of valves and other material procurements, is often the acquisition of a product that does not meet the fleet customer requirements and creates a multitude of downstream costs to the Navy.

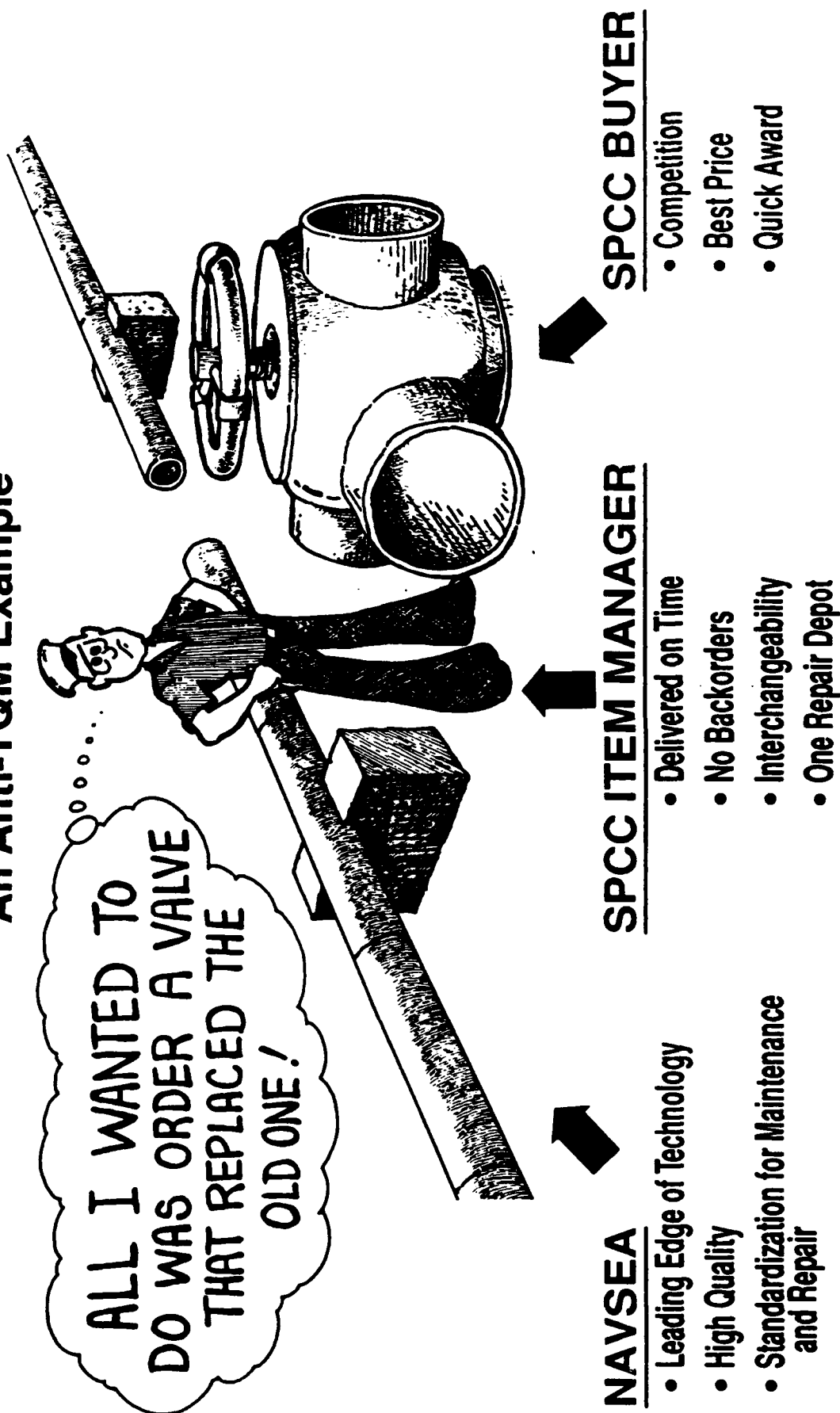
Finally, in order to correct the anti-TQL activities present at SPCC a high degree of training of personnel must be conducted to change the way the command business is viewed. For example, the only way a buyer could be sensitive to the customer and item manager's requirements is through exposure to and some degree of training in these disciplines. The converse also applies as an item manager must realize that the buyer is their customer and can perform at an optimal level only with a solid requirements package.

TQM/L Barriers Removed. It is well-circulated fiction at SPCC that the contracting officer's hands are tied in terms of awarding contracts to the lowest bidder. The climate that has been established since the mid 1980's supports this view and the de facto situation is that without other guidance, a buyer has little choice but to obtain the best price. This situation is a result of the overpricing scandals, resultant competition advocacy, and the anti-TQM/L conditions existing at SPCC. The reality is that the Federal Acquisition Regulations (FAR) clearly give the contracting officer great latitude in awarding contracts as shown by this excerpt from FAR paragraph 15.605(b):

The evaluation factors that apply to an acquisition and the relative importance of those factors are within the broad discretion of agency acquisition officials.

FIGURE 4

The Effect of Organizational Priorities on the Fleet Customer: An Anti-TQM Example



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However, price or cost to the Government shall be included as an evaluation factor in every source selection. Quality shall also be addressed in every source selection. Any other relevant factors, such as cost realism, may also be included.

The top leadership in DOD supports a smarter approach to the acquisition process in a recent memorandum to the Services where the following principles were highlighted:

1. Provide Total Quality Management (TQM)
2. Buy "Best Value"
3. Be a "World Class" Customer
4. "Manage the Process" Efficiently²⁰

The Commander of the Naval Supply Systems Command further clarified and underscored the latitude granted to Contracting Officers when making contract awards when he stated the following:

"The importance of standardization of military warfighting platforms and the existence of life cycle or 'hidden' costs were well recognized by the Congress in the passage of the Competition in Contracting Act (CICA). Procurement legislation and regulations are intended to lower the cost of doing business, not add to it. Each law and regulation has exceptions or alternatives which allow the Contracting Officer to exercise judgment as to the law's proper application to the facts of a specific case. One area of latitude that has not been utilized to the fullest extent possible deals with the standardization provisions of CICA. There is a CICA exception which allows follow-on contracts for highly specialized equipments, including major components, to be obtained from the original source."²¹

The guidance from DOD and Navy leadership is clearly in support of using TQM/L as the means to improve fleet readiness and efficiency in procurement. Additionally, Navy leadership is behind the idea of using competition smartly. What is also apparent however, is

²⁰Memorandum from the Under Secretary of Defense for Acquisition to Secretaries of the Military Departments, "Improving the Acquisition Process", 15 February 1989.

²¹Letter from Commander, Naval Supply Systems Command to Field Commands, 22 February 1991.

that the barriers to implementing a practical approach to competition, such as goals and the lowest-bidder mentality, are still firmly entrenched. The TQM/L principles just discussed, such as awarding contracts based on price alone and doing business from a customer's perspective, will now provide the framework for examining the specific hidden costs of competition in procurement of spare parts at SPCC.

CHAPTER V

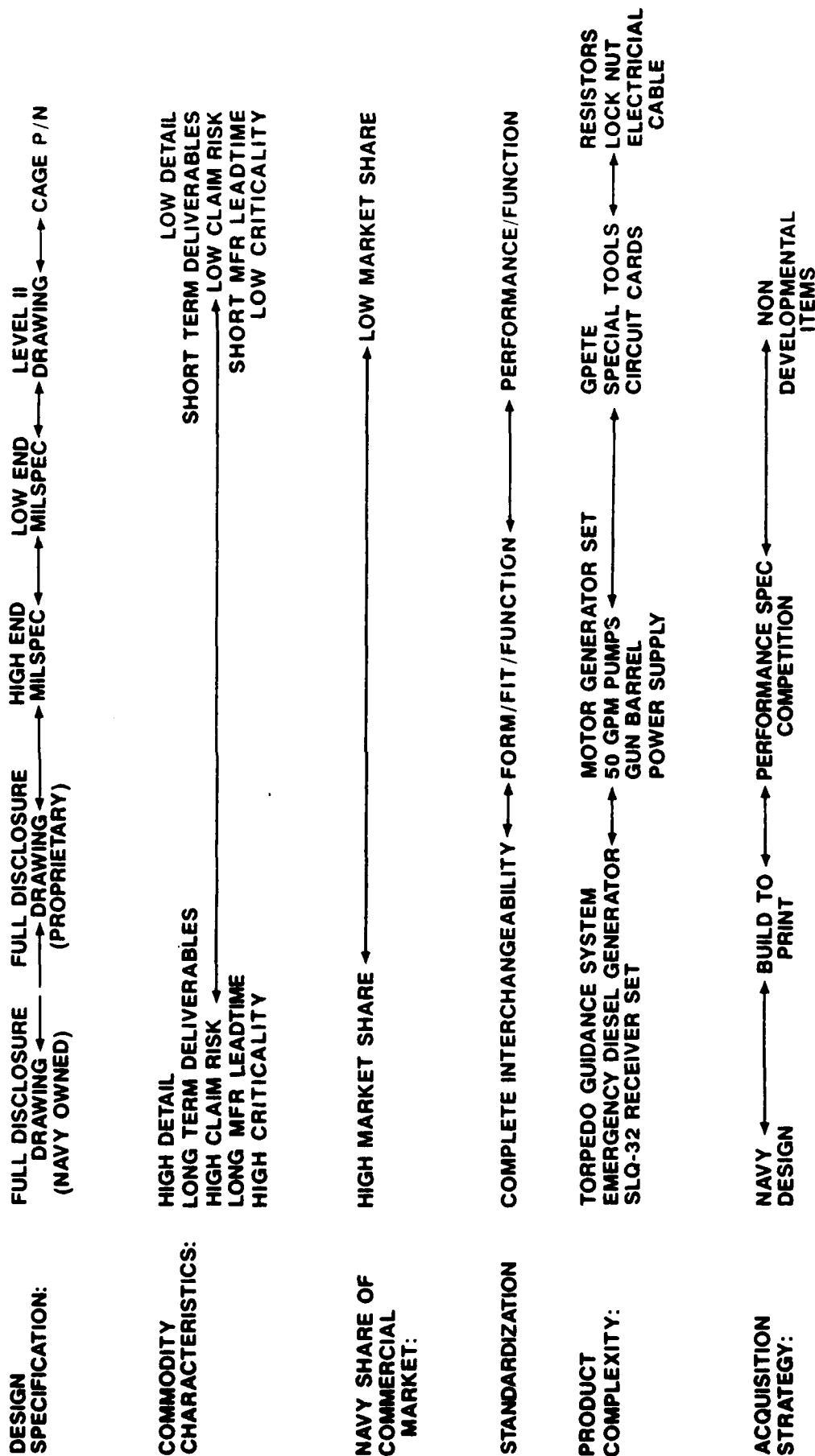
THE HIDDEN COSTS IN SPCC COMPETITIVE PROCUREMENTS DEFINED AND ILLUSTRATED

Foreword to Hidden Costs. This chapter is the critical component of this research. The first section of the chapter will show that there is no set recipe or acquisition strategy for every procurement. It will also describe the complex SPCC environment under which competition methods are logically, and not so logically, applied. The hidden cost elements of competitive breakout contracts will then be thoroughly examined and supported by numerous procurement history cases. Finally, the counterargument will be presented which will briefly outline the inherent positive benefits of competition in order to balance the analysis. These beneficial aspects are presented not merely to offer a counterargument, but rather to strengthen recommendations in favor of adopting more flexible acquisition strategies at SPCC.

The Application of Competition in a Complex Environment. The procurement of spare parts and components at SPCC is a dynamic and involved process. Very few acquisitions follow the same path in terms of procedures and level of difficulty. Figure (5) graphically depicts the environment in which the personnel at SPCC must make requirements and procurement decisions. SPCC procures components that encompass a wide spectrum of specification, characteristics, commercial market share, and acquisition strategy preference. Parts requirements are generated for items ranging from lock nuts to SLQ-32 electronic warfare receiver sets. The previous four chapters established how the enthusiasm, or goal-driven efforts, to foster competition impacted business at SPCC and the best way to describe this impact is to visualize competitive strategies becoming the driving force on the entire set of factors

FIGURE 5

THE CHALLENGE OF APPLYING COMPETITION TO THE SPECTRUM OF SPCC COMMODITIES



represented in figure (5). To illustrate, the potential hidden costs from competition associated with a Navy designed and owned specification are considerably lower than the likely hidden costs related to a performance specification competition. This often illogical application of competition can be extremely problematic, such as when savings accrued from competition ignore hidden downstream costs in both economic and readiness terms.

The outcome of this set of circumstances described above is some remarkable competition success stories, but also some incredible debacles. If one were to make an analogy to the civilian marketplace, it would be similar to a company procuring and managing their coal in the same fashion as diamonds. Certainly, General Motors does not maintain the same procurement strategy in buying engines as it does for light bulbs. SPCC does exercise some flexibility in contracting procedures for commodities of various complexity levels, but the influence of competition advocacy has helped to foster a rather inelastic climate for smarter and more innovative procurement strategies. This chapter will identify; the problems with the competition algorithm that decides what items should be procured competitively, the specific hidden costs of competition, and provide examples of faulty competitive procurements.

The Competition Algorithm. An entire research project could be performed concerning the development and application of the competition algorithm used in determining the acquisition method for spare parts and components. This section of the chapter will provide a brief description of the model, highlight some of the strengths and weaknesses, and illustrate how the model can foster a bad decision to open an item of supply to competitive procurement.

The purpose of the competition model is to decide which items of supply are suitable for competitive procurement or should be procured sole source from the original equipment

manufacturer. It is an economic analysis that compares the costs the Navy would incur to create competitive conditions versus the potential savings that the market forces of competition will yield. As candidate items of supply are considered in this model, the determination is made whether to continue to procure the item sole source, open the item to competition, or to gather more technical data prior to competitive procurement. The end result is that the candidate spare part may have a revision to its Acquisition Method Code (AMC) which tells the procurement official how to procure the item. The significance of this process lies in the potential of the algorithm to make a bad decision if either the predicted costs or savings are inaccurately calculated or estimated. The details of the competition algorithm are provided in DOD FAR Supplement Number 6, DOD Spare Parts Breakout Program and a brief synopsis and analysis of the process will now be provided.

The potential savings is calculated by computing the item's annual buy value and applying a competition savings factor of 25 percent. To illustrate, if it is predicted, based on annual demand estimates, that annual procurements for a previously sole source component will cost \$10,000 then it is estimated that a competitive acquisition of this item will save \$2,500.

Two points are worthy of mention concerning the savings portion of the algorithm. First, the annual demand figures for items of supply, from which the annual buy value is calculated, can be extremely volatile depending on the commodity and unique usage rates. It is no more than a forecast based on historic usage and subjected to smoothing factors to compensate for inordinately high and low spikes in demand. Since unit prices quoted for contracts tend to go down with increased quantity, this demand estimate will directly impact the accuracy of the model. For example, if the competition model decided it was economical to compete an item

supported by an annual demand estimate of 20, and based on the above factors the actual annual buy was for a quantity of 2, then the potential savings decline significantly versus the costs to compete. Another effect on demand can be design stability. It is not unusual, particularly in combat systems and electronics, to see numerous engineering changes to components. This also can have an erratic effect on demand and attempts to compete items.

The second point of consideration in the savings factor lies in the use of a blanket 25 percent savings figure. This figure has been derived from historical data on cost avoidances resulting from competition and is an average figure. Again, this is a far less than ideal way of calculating savings since the percentage of savings from competition has to be sensitive to commodity. For example, the profit margins tend to be higher in HM&E equipment versus electronics so the effects of competition would have different effects on diverse component acquisitions. Also, the intensity of competition varies from industry to industry, and even among procurements, making a blanket 25 percent figure suspect.

The cost portion of the competition model requires an in-depth economic analysis of the direct costs to break out a spare part to competition such as government tooling and test equipment, qualification testing (such as first article test (FAT)), and quality control expenses. This portion of the model is effective in estimating competition costs for items whose specification is a Navy design or "build to print", meaning the exact configuration is set by drawings and other strict specifications. The model weakness lies in the attempt to estimate the costs for components procured under a performance specification. Since, generally, items procured under a performance specification introduce a new item or items of supply to the Navy, significant indirect costs can accrue. Most of these costs are a result of integrated logistics

support (ILS) and these will be explored further in the next section of the chapter, but FAR Supplement 6 requires their inclusion in the breakout decision. Currently, breakout ILS costs such as cataloging, training, maintenance, and supply are either estimated poorly or not at all.

Normally, the competition algorithm does not consider the performance specification items for competitive buys as the pressure to develop and compete an item under a performance specification comes from another source such as NAVSEA using performance specifications in shipbuilding contracts. Even when the model considers these costs it is by using generic figures or estimates. For example, when estimating the costs for logistics to compete an electronics item of supply, the Naval Sea Logistics Center uses a checklist that provides a generic cost for logistics depending on the complexity of the item. The values range from \$1000 to \$8000.²² This type of estimation can produce severely under or over-stated figures as the complexity of a component can vary much more widely than this type of model or checklist is capable of estimating. As a brief example, if the power amplification module of a torpedo guidance system was being considered for a competitive procurement, even the most complex estimate on this checklist would only compute a logistics cost of \$8000. In reality, the number of subordinate piece parts in a sophisticated component such as this would drive logistics costs such as cataloging and outfitting of new spare parts into the \$100,000 range; not to mention the significant other ILS costs that would evolve.

The conclusion to be reached concerning the competition algorithm is that it is inadequate and that it can create a scenario for sub-optimal competition decisions, particularly in the area

²²Naval Sea Logistics Center, Breakout Cost/Savings Checklist, Mechanicsburg, PA: January 1991.

of performance specification procurements. The next section of this chapter will elaborate on the actual hidden costs produced by competitive procurements.

The Hidden Cost Categories. The strong influence that competition has had on the way SPCC conducts it's business has been clearly depicted in both the competition environment and algorithm. This mode of operation has led to the creation of hidden costs associated with competitive procurements. The costs fall into the following categories:

1. Integrated Logistics Support (ILS) and Standardization
2. Increased Procurement Lead Time (PLT)
3. Contract Administration and Post-Award Costs
4. Increased Risk of Costs of Non-Performance
5. Costs of Exigency Buys
6. Quality and Readiness Costs

Each of these categories will now be examined in detail.

ILS and Standardization Costs. The introduction of a new spare part or component to the supply system will almost always equate to some level of increased costs in the area of ILS. When developing major system acquisitions, it is often estimated that 80 percent of life cycle costs are associated with ILS versus actual system purchases.²³ This assertion can also be applied to spare parts purchases in a varying, but significant degree. There are many variables to this statement, as Figure (5) portrayed. If the design specification is complete and absolute interchangeability is specified, then the potential for hidden ILS costs is significantly reduced. If, however, the required item is complex and will be procured under a liberal performance specification (meaning the item may bear little resemblance to the same equipment already carried in the supply system), then the risk of incurring significant ILS costs is high. To put

²³Naval Audit Service, Management Consulting Report- Logistics Analysis Review (Washington, DC: October 1989), p.1.

it simply, the more the item differs from its predecessor, the greater the probability that ILS costs will increase.

The specific, variable elements of ILS costs include the following:

1. Provisioning- The cost to develop the Allowance Parts Lists (APLs) which are the supply and technical listings for a component.
2. Cost of NSN Maintenance- This cost is a function of the number of new items of supply introduced to the system and includes holding costs for material. Additionally, some range and depth of these new parts must be stocked at various wholesale and retail levels.
3. Cost of Training- This cost involves the investment required to provide and maintain training facilities for new equipments.
4. Technical Manuals- The cost to review and procure additional technical manuals required for new equipment.
5. Cost of Installation Drawings- The cost of drawing sets required for ship classes.
6. Cost Configuration Control- This cost entails the required submission and processing of configuration change reporting documentation.
7. Cost of Planned Maintenance- The cost of modification to existing PMS.²⁴

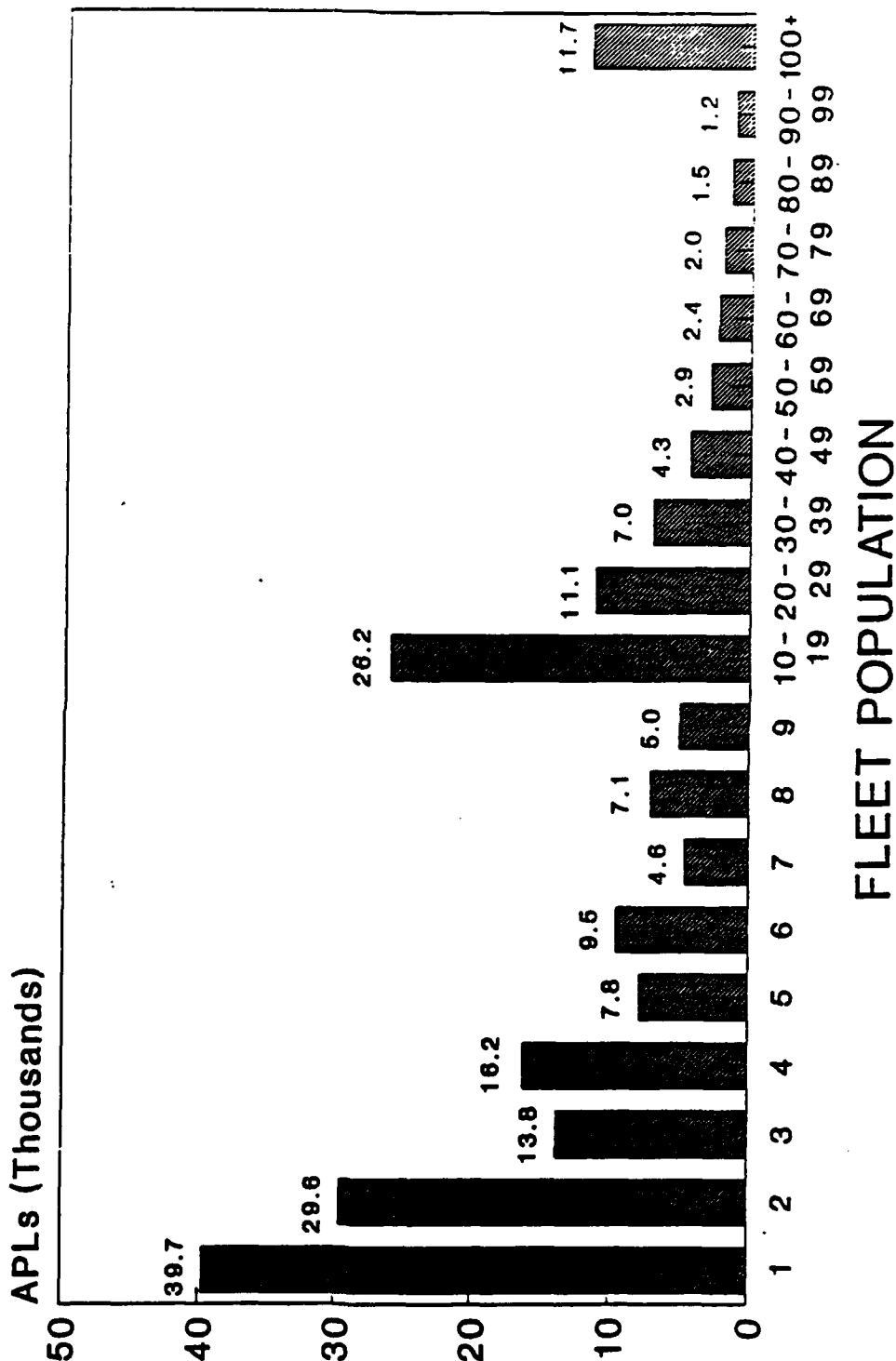
From the major system acquisition perspective, the Naval Sea Systems Command (NAVSEA) has recognized the importance of the above elements in terms of both ILS costs and maintaining standardization of shipboard equipments. The lack of standardization is dramatically portrayed in Figure (6) which shows the number of APLs versus fleet population. For Hull, Mechanical and Electrical (HM&E) equipment alone just under 70,000 APLs have 2 or less installations and this is an ongoing problem being addressed by NAVSEA. Of further

²⁴Naval Sea Logistics Center, Analysis of the ILS Costs Associated with the Introduction of New Equipments to the Navy. (Mechanicsburg, PA: 1991), pp. 1-9.

FIGURE 6

HM&E EQUIPMENT DESIGNS

TOTAL = 203,605



A/O MAY 1989

Source: Ships Parts Control Center, Weapons Systems File Data,
Mechanicsburg, PA: May 1989

significance is the fact that this dilemma is further proliferated at the spare part/component level by procurement activities such as SPCC. Again, using HM&E components as an example, from 1977 through 1988, an average of 28,599 new items of supply (NSNs) were introduced to the supply system per year. NAVSEA estimates the cost for new ILS for these items at over \$300 million per year.²⁵ Some of the additional NSNs were, no doubt, unavoidable, but the rise in competitive procurements has produced a parallel increase in new items of supply and ILS hidden costs.

NAVSEA has successfully employed a procurement strategy that includes the use of ILS costs as a factor in awarding a competitive contract. The ILS cost factor computations can be found in Appendix II, but using provisioning as an example, if new items of supply were to be introduced to the supply system the cost of provisioning would be calculated as follows:

$$\text{COST OF PROVISIONING} = \$450 + \$300 (\text{NPN}) + \$75 (\text{PN})$$

WHERE: NPN = NUMBER OF NEW ITEMS OF SUPPLY
PN = NUMBER OF CURRENT ITEMS OF SUPPLY

To carry this example further, if SPCC awards a competitive contract to a new manufacturer under a performance specification for a valve that contains 10 new piece parts (for a total of 11 new items of supply), the hidden cost of provisioning would be calculated as follows:

$$\text{COST OF PROVISIONING} = \$450 + \$300 (11) = \$3750$$

These costs along with the costs of the other ILS elements can quickly accumulate. Examples provided later in this chapter, from SPCC procurement histories, will illustrate the degree to which a competitive contract award can tally up the ILS hidden costs.

²⁵Briefing Paper, Naval Sea Logistics Command, "Analysis of the ILS Costs Associated with the Introduction of New Equipments to the Navy", Mechanicsburg, PA: 1 November 1991.

In order to utilize ILS costs in the contract award decision process the model to calculate these costs must be auditable so as to stand up to potential protests by a losing bidder. The current NAVSEA model, which has been successfully used in some major system purchases, needs updating and annual review if it is to sustain the scrutiny of the solicitation and award process for spare parts and components.

Increased Procurement Lead Time (PLT). An increase in PLT for spare parts translates to an increased investment in inventory. The key variable in the SPCC and all other inventory models is time. For every day of additional procurement lead time incurred, the amount of pipeline inventory is increased and the dollar investment expanded. The amount of increase is dependent, of course, on the item cost, but to provide a generic example from the world of repairables; every day of system repair turnaround time, or time required to get "ready for issue" (RFI) parts back into the supply system, translates to approximately \$2 million in additional inventory costs.²⁶ The increase in procurement lead time works in virtually the same fashion to increase the investment in inventory of spare parts and components. An additional cost can also be acquired when unexpected, inordinate, increases in PLT cause an item to be out of stock. When this occurs SPCC is often in a position of having to go back to the original equipment manufacturer (OEM) for a contingency buy. More will be provided on the subject of exigency buys shortly, but now the manner in which competition creates a PLT cost will be examined.

The Japanese, and more recently American, businesses have painfully learned the lesson

²⁶Interview with Hiram Calkins, Director, SPCC Repair Operations Division, Mechanicsburg, PA: 14 December 1991.

of inventory investment and are actively attempting to employ Just-in-Time (JIT) inventory methods with the goal of reducing the cost of the inventory itself plus all the associated storage and holding costs. The significance of this principle lies in the fact that manufacturers that are producing Navy spares/components for the first time will usually exceed the PLT that could have been obtained from the OEM. New sources must often be qualified and a First Article Test (FAT) must be conducted on material before full production can be started. Specifically, the breakout of an item to competition requiring the imposition of FAT usually requires an additional leadtime of approximately 9 months.²⁷ Consequently, an additional 9 months of inventory must be procured and in the pipeline to cover customer requirements. The competition algorithm does not account for these PLT costs. This additional time equates to increased inventory investment dollars that the Navy can not afford.

Contract Administration and Post-Award Costs. In addition to the costs associated with increased time to procure spare parts from first-time competitors, there exists a higher level of administration of these contracts. These additional costs are primarily intended to reduce the government's risk of bringing the new producer into the business. Some examples of these costs include pre-award conferences and surveys, post-award conferences, referrals or questions from the contractor, First Article Tests (FAT), and receipt inspections. The award process attempts to consider some of the costs (primarily FAT) in a competitive situation, especially when the original, sole-source manufacturer is in the competition. Often, however, the majority of these costs are simply a part of the overhead of doing business at either SPCC or Defense contract

²⁷Ships Parts Control Center, Processing Concurrent Buys, SPCCINTINST 4200.57A (Mechanicsburg, PA: 27 January 1988), p.1.

administration activities.

The costs outlined above can be significant, especially when a company is having difficulty meeting the terms of the contract. Small firms are often unfamiliar with the paperwork and other particulars of dealing with government contracts. In these cases it is not unusual to see numerous purchase referral questions and repeated efforts to meet FAT and receipt inspection requirements. Appendix III provides a detailed breakdown of the typical contract administration cost categories and some generic costs associated with each. These are only averages and would be situation dependent, but to provide a flavor for typical charges; a pre-award survey may cost \$1,380, a FAT for \$500, receipt inspections at \$1,360, and a purchase referral question might require \$640 to answer. On a problem contract the total bill can reach well into the thousands of dollars. Unfortunately, no organization tracks these costs as an expense of managing competitive contracts and it is simply buried in overhead. Bear in mind that most of the contract administration costs described above would be unnecessary or waived for a company that has previously manufactured the spare part or component for the Navy.

Some examples later in the chapter will depict the impact of contract administration costs on competitive contracts. The next section of this chapter will carry the hidden cost scenario one step further and that is when a company reaches the point where it can not perform on a competitive contract and the Navy must take action to terminate the contract and find alternate means to support fleet requirements.

Increased Risk of Costs of Non-Performance. One of the truly hidden costs of bringing new manufacturers into the spare parts business has been the increased risk of non-performance. To the contracting group at SPCC this unfortunate fallout from competition has become a

predictable cost of doing business. As one SPCC contracting division director, who desired to remain anonymous, commented on this situation, " Saving short term dollars and meeting goals for competition drive the problem. If supplies happen to make it to the shelves then that is a fortuitous side effect."

In an interview with the former deputy director of the Contract Administration department at SPCC, he stated that from his experience, at least 99 percent of non-performance contracts were first-time competitive. In fact, in over 10 years in his position in contract administration, he could only remember around a dozen cases where a non-performer was a sole source manufacturer.²⁸ The costs incurred from a contract that does not deliver are significant, from both a financial and fleet readiness standpoint, and include the expenses of having to terminate the contract. This process is often accompanied by significant legal fees.

An example is provided by the aborted purchase of flow control valves (NSN 1045-00-623-0228) in a 1987 contract. The original manufacturer of this combat systems equipment valve, Murotta Scientific, could not even bid on this contract as it was not only slated for competition, but also marked as one that would be awarded to a small business, thus satisfying two goals with one procurement. Again, a responsible company not only lost the business opportunity, but also even a prospect of bidding on the contract. The contract was awarded to a company called SEB Engineering for a quantity of 1083 valves at a cost of \$219.00 each. Murotta Scientific had provided this item on a 1979 sole source contract at a price of \$154.00 each so it is reasonable to assume that their 1987 bid would have been extremely competitive

²⁸Interview with Mahlon McCoy, Former Deputy Director, SPCC Contract Administration Department, Mechanicsburg, PA: 13 December 1991.

with little risk of non-performance. In any event, SEB Engineering could not deliver any satisfactory material and after repeated attempts at passing First Article Test (FAT), the Navy moved to terminate the contract. During the course of this termination, SPCC contracting personnel had to travel to Minneapolis and work with Defense Contract Administration Service personnel. It is estimated this travel cost \$8000 to \$10,000 over the course of the termination procedure. Additionally, approximately \$50,000 in legal fees were required to finalize the case. The costs of all the personnel labor hours expended in this situation are difficult to accurately assess, but it would be in the order of thousands of dollars. It should also be noted that since no valves were being delivered to stock, exigency buys to Murotta were required at a cost of \$631.35 each or approximately 200 percent above the 1987 bid price.²⁹

In the final analysis, the above interviews and case illustrate that the competitive process, particularly the attempts to fill goal quotas, has set the stage for the acceptance of a high level risk of non-performance in first time competitive breakouts. The pre-award survey process often fails to reduce this risk as was evident in SEB Engineering's case. This non-performance leads to profound hidden costs that occur long after the SPCC Contracting Group and Competition Advocate have taken credit for a successful competition and dollar savings.

The Cost of Exigency Buys. The hidden costs associated with increased procurement lead time and non-performance often force SPCC to make exigency buys in support of fleet requirements. These emergency situations can develop when an item manager reaches a low or not-in-stock (NIS) situation for a spare part. Once a contract has been awarded for material,

²⁹Interview with Mahlon McCoy, Director, Gun Systems Contracting Division, Mechanicsburg, PA: 14 December 1991.

the item manager will have no reason to suspect that the item will not deliver on time or that the manufacturer will not perform. The average SPCC procurement lead time is approximately 18 months, so by the time this predicament is apparent an item may be approaching or in an NIS condition. At this point in the typical scenario, SPCC is forced to consider an exigency buy to maintain an adequate stock position. For delinquent contracts that have been awarded to a first time competitor, the logical step if the contract delivery probability is low, is to approach the original equipment manufacturer (OEM) and attempt an exigency procurement. Since the OEM may have been on the losing end of the competition for the original contract and the emergency buy is generally for a lower quantity plus quick delivery, there is some incentive for the OEM to take advantage of the Navy's "in-extremis" circumstance.

The cost for exigency buys can be considerable, often ranging from 50 to 200 percent above a normal stock contract price. The most critical of the exigency buys occur as a result of the Navy's Casualty Reporting (CASREP) system which document mission critical parts requirements. In fiscal year 1991 SPCC spent \$12 million procuring spare parts and components to satisfy CASREP requisitions. Of this total approximately 25 percent, or \$3 million, was consumed for spot buys of material from OEMs when a competitive contract failed to deliver.³⁰ This bill often included premium pay and overtime payments of 50 to 100 percent above a normal contract price. Additionally, these parts requirements are usually shipped by fastest traceable means such as overnight air and other express routes which add another undocumented, hidden cost to this event.

³⁰Interview with James Hartmann, Director, SPCC CASREP Contracting Division, Mechanicsburg, PA: 14 December 1991.

The CASREP example is presented as a highly visible and substantiated instance of the effects of competitive procurements, but is only the tip of the iceberg regarding exigency purchases. SPCC spends millions of dollars per year on non-CASREP spot buys of material in support of poor stock positions, again, due to delayed or non-performance of competitive contracts. One example is provided by SPCC's procurement of salinity cells (NSN 6630-00-675-6370) which are used in Navy boiler systems. This item had previously been a sole source procurement to McNab Inc. until 1981. Two other companies, Marine Electric RPD Inc. and Rosemont Analytical Inc., competed for the business and won SPCC contracts from 1981 to 1983 with prices ranging from \$307.40 to \$349.00 each, depending on quantity. The OEM's, McNab, bid was \$378.45. Neither of the winning companies could pass FAT and deliver the salinity cells they produced until 1989. During this period the item was routinely NIS and customer backorders reached well into the hundreds. Fleet users grew impatient, canceled their orders with SPCC and began procuring salinity cells via individual open purchase documents to McNab Inc. at greatly inflated prices. SPCC initiated it's own exigency buy for salinity cells to McNab in 1989. The price paid for a quantity of 29 of these cells were \$853.92 each, over 100 percent higher than the original contract or bid prices.³¹

The above example does not entirely detail all the costs to the Navy in terms of contract administration and personnel labor hours for these types of exigency purchases. Additionally, the cost in terms of fleet readiness and confidence in the Navy supply system can not be quantified, but is significant.

³¹Interview with Tim Condon, SPCC Inventory Manager, Salinity Cells, Mechanicsburg, PA: 15 January 1992 and Data from SPCC Procurement History Files.

It is difficult to predict in advance which competitive contracts will not deliver on time, if at all. SPCC has attempted to reduce the risk of doing business with first time competitive contractors with a program called "concurrent buy" that allows the procurement of an insurance quantity of material from the OEM in addition to the competitive contract. This program has been largely ineffective as it is labor intensive and more expensive than awarding a single contract, but when considering the hidden costs that can be incurred, this procedure or some revised version of it should be more widely employed. Further, the pre-award survey and award processes must do more to reduce the risk of non-performance, but these recommendations will be amplified in the final chapter.

Quality and Readiness Costs. The question of whether the increase in competitive contracts has adversely affected the quality of spare parts purchased is difficult to answer. This is another issue worthy of more extensive research than this report can confront, but it will be examined briefly. Some well publicized stories of competition awards to the lowest bidder resulting in sub-standard material deliveries would lead one to postulate that quality suffers in a competitive environment. The Defense Logistics Agency (DLA) had a serious problem with many grades of fasteners that were awarded to low bidders who subsequently used inferior material in the manufacturing process in order to cut costs.

Likewise, SPCC has had it's share of similar cases. A recent case involved the purchase of Digital Display Indicators (NSN- 6110-01-039-5537) used on the DD-963 and FFG-7 class ships. Competed under a performance specification, the original manufacturer, Litton Systems Inc., lost the bid to Centroid Inc. by a margin of \$38.00. Centroid won the contract with a bid of \$684.00 each for a quantity of 386, convinced SPCC that the component was identical to the

Litton part, and delivered the contracted units one year late. Quality Deficient Reports (QDRs) from the fleet started to arrive at SPCC shortly thereafter indicating compatibility problems and the item became a major readiness issue. Although this case is not finally resolved, it appears that Centroid used some faulty sub components and misinterpreted the original Litton drawings. SPCC had to make an exigency buy to Litton for a quantity of 78 at a cost of \$1055.00 each or approximately a 50 percent increase over the original bids. Centroid claims to need an additional \$105.00 per unit to repair the defective units and this issue is still being negotiated.³²

The matter that is difficult to answer is whether the above cases are anomalies or whether there are widespread quality problems as a result of increased competition for spares business. The opinions of SPCC item managers and larger defense contractors support the former view, but a study by DLA's Operations Research and Economic Analysis office was inconclusive on this subject. Specifically addressed in this 1990 study were how the quality patterns of items broken out from sole source to multiple sources have changed. The basic results were summarized as follows:

"For the vast majority of items broken out to competition there were no recorded valid contractor-caused complaints from the Customer Depot Complaint System (CDCS) file and no recorded Quality Evaluation Program (QEP) actions. When complaints from the CDCS were present, the results were mixed. When QEP activity occurred, it was more frequent after breakout than before. No overall conclusion could be reached with respect to development of quality trends due to competition effects. This issue should be analyzed in the future when more extensive data has accumulated and/or the procurement environment has changed."³³

³²Interview with Jaye Smith, SPCC Item Manager, Digital Display Indicators, Mechanicsburg, PA: 15 January 1992 and Data from SPCC Procurement History Files.

³³Defense Logistics Agency Report, "The Impact of Competition on Quality", Operations Research and Economic Analysis Office, Cameron Station, VA: September 1990.

Although this study was mainly inconclusive, the spare parts and components procured by SPCC are more complex than DLA material, making them more prone to quality problems. Additionally, the source data for this study consisted of nothing more than customer generated QDRs which makes it somewhat suspect. In the next chapter some defense contractors will expand on this subject.

This issue needs a more in-depth analysis that is targeted at SPCC competitive contracts. The interviews and cases explored for this research project would support further study of the quality issue and recommendations for improvements, however, the basic solutions offered in the Conclusions chapter will certainly have the coupled effect of curbing some of the quality problems with competitive procurements.

Illustrative Examples of Competitive Contract Hidden Costs. This final section of the chapter will provide cases from SPCC competitive procurements that illustrate all the previously discussed hidden cost categories. Some modest examples have been provided in this and preceding chapters and will now be developed further. The cases presented here will show everything from the simple accrual of hidden ILS costs to a worst case instance where all the hidden cost elements have occurred, extending to millions of dollars. The examples cited here are more than anecdotal as interviews with SPCC personnel and reviews of procurement histories reveal a myriad of similar cases.

Example #1: Fire Safe-Vent Valves (NSN- 4820-01-319-0032)

As a result of the mistaken Iraqi attack of the USS Stark and the subsequent catastrophic fires, a major investigation finding was that the aluminum vent valves melted and malfunctioned. In order to correct this safety problem, the Navy directed the installation of steel vent valves on

FFG-7 class ships and procured these valves from a manufacturer named Keystone Corporation. The fire-safe valves were of various sizes, but this example deals with a simple configuration called the R-5 valve. The R-5 version is capable of being repaired at the fleet level and contains 10 piece parts, such as valve seats and stems. As requirements were generated for follow-on procurements, the valve was coded for competition and SPCC attempted to procure the data rights from Keystone. Keystone asked for \$30 million for the drawings and specifications which was rightly deemed to be an exorbitant price. At this point a performance specification was developed and a solicitation was made for a quantity of 10 valves. Keystone submitted it's original configuration at a bid price of \$2500.00, but lost the competition to Tri-Tec Corporation whose bid was \$2361.00. For this buy quantity of 10 the Competition Advocate will claim a cost savings of \$1390.00 on this procurement.³⁴

The figures in Table I show how this simple acquisition, in fact, will actually cost the Navy thousands of dollars over just a 15 year period. The comparison of costs shown here exemplify how hidden ILS expenses can far exceed any savings from competition, particularly when sub-component piece parts must be cataloged and managed. Table I also identifies some of the more intangible costs associated with this procurement. Earlier in the chapter a NAVSEA estimate was provided asserting that approximately \$300 million per year was required to support new ILS for the average 28,599 new HM&E stock numbers added to the supply system each year. The Fire-Safe Vent Valve example validates and makes this estimate appear extremely realistic.

³⁴Interview with Mahlon McCoy, Director, SPCC Electronics Systems Contracting Division, Mechanicsburg, PA: 13 September 1991.

TABLE I

EXAMPLE #1- FIRE-SAFE VENT VALVES

COST FIGURE CATEGORIES	KEYSTONE CORP.	TRI-TEC CORP.
Unit Cost (10 each)	\$25,000.00	\$23,610.00
Provisioning (12 parts)		\$ 4,050.00
NSN Maintenance (15 year)		\$29,025.00
Configuration Control		\$ 200.00
Technical Manual		\$ 750.00
Planned Maintenance Revisions		\$ 500.00
Installation Drawings		\$ 1000.00
Totals	\$25,000.00	\$59,135.00

Other Intangible Hidden Costs

1. Standardization problems.
2. The requirement to support two configurations of vent valves.
3. Unnecessary proliferation of new stock numbers.
4. The ILS costs to maintain stock numbers increases if the life cycle of this valve is greater than 15 years.

Source: Ships Parts Control Center, Procurement History Files and Naval Sea Logistics Center ILS Cost Algorithm (Mechanicsburg, PA: 13 December 1991).

Example #2- Radar Set Sub-Assembly

Since the next case discusses an ongoing procurement, the component name and the companies involved in this example have been changed due to the proprietary nature of the pricing information that will be provided. In this acquisition the competitor, XYZ Corporation, submitted a bid that was \$25,000 below the OEM, ABC Corporation, for a quantity of 25 radar sub-assemblies. Table II presents the cost comparison and the ILS expenses tip the scales in favor of the OEM, but not by a wide margin. This example is presented to show how a significant \$25,000 competition savings can be quickly erased by long-term hidden costs but, this award would present a difficult decision process for the contracting officer and the legitimacy of the ILS cost factor model would certainly be put to the test. For this reason, the model must be auditable if it is to sustain the scrutiny and possible award protest in a procurement. Also a consideration in such a close judgment is the risk associated with whether the XYZ Corporation can perform and deliver the product on time, in accordance with the specification.

Example #3- Gun Maintenance Fixture (NSN- 1H-1005-01-216-0096)

The purpose of the this example is to show how competition can produce an environment where companies "buy-in" to a procurement at a bid price that is unreasonably low. The frequent result in this type of scenario is tremendous costs to the Navy resulting from non-performance. This failure to deliver contracted material manifests itself in significant contract administration and exigency procurement expenses. Hidden ILS costs were not a factor in this instance since the item was a build-to-specification, standard design.

The subject of this case is a Gun Maintenance Fixture used to repair components of the Close-in-Weapons-System (CIWS) found on most Navy ships and at repair activities. SPCC has

TABLE II

EXAMPLE #2- RADAR SET SUB-ASSEMBLY

COST FIGURE CATEGORIES	ABC CORP.	XYZ CORP.
Unit Cost (25 each)	\$135,000.00	\$110,000.00
Provisioning (10 parts)		\$ 3,000.00
NSN Maintenance (15 year)		\$ 24,187.50
Configuration Control		\$ 500.00
Technical Manual		\$ 625.00
Planned Maintenance Revisions		\$ 500.00
Installation Drawings		\$ 4000.00
Totals	\$135,000.00	\$142,812.50

Other Intangible Hidden Costs

1. Standardization problems.
2. The requirement to support two configurations.
3. Unnecessary proliferation of new stock numbers.

Source: Ships Parts Control Center, Procurement History Files and Naval Sea Logistics Center
 ILS Cost Algorithm (Mechanicsburg, PA: 4 February 1992)

had no historical problems buying this item from a company called Command Enterprises, however, in 1988 a contract for 208 of the units was competed and awarded to the low bidder, a company named Engineering Inc. Interviews with item management and technical personnel reveal that the winning bid (\$479.00) was not feasible, especially when compared to the audited costs of Command Enterprises latest contract price of \$814.00 per unit. Unfortunately, this technical expertise was not a consideration in the award process which, again, highlights the anti-TQM barriers between departments at SPCC. In any event, the award was made to Engineering Inc., and the Competition Advocate could claim thousands of dollars in cost avoidance.

Engineering Inc. had great difficulty executing this contract as evidenced by their failure to deliver on time, failure to pass FAT, numerous requests for waivers and deviations to the contract, quality deficiencies, and finally, the Navy's effort to terminate the contract. Attempting to assign costs to these types of problems is difficult, but a conservative estimate is offered in Table III using the cost elements of Appendix III. The costs associated with contract administration are based on the extensive efforts required by SPCC administrators to get delivery of this material, which continued to accumulate fleet backorders as Engineering Inc. became more and more delinquent in delivery. The contractor claim for \$60,000 is an attempt by Engineering Inc. to recoup costs they assert were caused by the government and includes \$15,000 in harassment costs. This claim is still being handled by the SPCC legal department. Since Engineering Inc. was overdue in their delivery, a 1989 exigency buy was required from Command Enterprises to handle the urgent customer backorders at a unit price that was 136 percent above the 1988 contract. Only after SPCC threatened Engineering Inc. with a

TABLE III
EXAMPLE #3- GUN MAINTENANCE FIXTURE

COST FIGURE CATEGORIES	ENGINEERING INC.
Waiver and Deviation Purchase Referrals	\$ 5,760
First Article Test (FAT)	\$ 1,500
Quality Assurance Letter of Instruction	\$ 755
Termination for Default Proceedings Show-Cause Letter	\$ 1,000
General Contract Administration- Source Inspections and Other Personnel Manhour Requirements	\$ 8,500
Contractor Claim	\$ 60,000
Legal Fees	\$ 5,000
Exigency Procurement to Command Enterprises (Quantity- 22)	\$ 24,904
Total	\$107,419

Other Intangible Hidden Costs

1. Maintenance and readiness issue with fleet customers.
2. Loss of confidence in the supply system.

Source: Ships Parts Control Center, Procurement History Files and Interview with Diana Holtrey, SPCC Item Manager for Gun Maintenance Fixture, Technical Evaluation Adjustments-Contract Administration Costs.

termination for default did they finally make deliveries; almost one year after the required delivery date.

All of the above illustrate a concealed problem area with competition in that the incentive exists to "buy-in" to a contract with a low bid and attempt to make up the margin with inferior materials, poor quality, and endless waivers, deviations or claims against the government. In a situation where the Navy is in urgent need of the material, a contractor really holds a trump card.

The astonishing detail presented in Table III is that the total contract administration, claims and exigency buy costs of \$107,419 exceed the total contract price awarded to Engineering Inc. of \$99,426. Interviews with contract administration personnel at SPCC indicate that Engineering Inc. has exhibited similar poor performance on other Navy and DOD contracts.³⁵ This issue leads one to question the process which awards a contract solely on price, does not consider past performance histories of contractors from both a quality and delivery perspective, and does not evaluate price reasonableness. In the solicitation for this contract, Command bid \$619 per unit. An award to Command based on past performance and a thorough pre-award survey of Engineering Inc. would have cost the Navy \$147 more per unit, or \$30,576. This certainly pales in comparison to the \$107,419 spent just to obtain delivery of the Engineering Inc. contract.

Example #4- High Pressure Gauge Calibrator

This case can truly be considered the capstone example in this study as it embodies all

³⁵Phone Conversation with June Claybaugh, SPCC Contract Administrator, Mechanicsburg, PA: 5 February 1992.

the hidden cost elements. Everything from the forced use of competition to the acquiring of hidden ILS and exigency costs is exemplified by this procurement. The facts of this acquisition require some extensive background which will now be provided. The costs comparisons can be found in Table IV.

The subject component in this example is high pressure (0-10,000 psi) gauge calibration equipment used in a multitude of engineering and combat systems applications and is found on most Navy ships and shorebased repair activities. The calibrator was designed by, and has always been a sole source procurement to, King Neutronics Inc. In the early 1980s companies in related businesses started pressuring the Navy, via Congressional channels, to open the item to competition. Since this equipment is quite sophisticated and was designed by King Neutronics, the Navy attempted to purchase the proprietary data rights, but this proved to be cost prohibitive. At this point NAVSEA elected to develop a performance specification that would allow a wide range of competition.

In 1984 the gauge calibrator was opened to competition using the performance specification and all sole source procurements to King were suspended. It should be noted that the fleet was perfectly satisfied with the King unit which had been reliable and experienced virtually no quality problems. Additionally, the King calibrator was a repairable component for which all the repair standards, maintenance and training procedures were in place.

Eight companies, including King, bid on this contract for 309 calibrators to be delivered over a three year period. The bid range was from \$13,800 to \$91,650 each, with King's bid submitted at \$19,624. The King submission entailed an upgraded version of their original unit, to meet the performance specification standards, that utilized approximately 2/3 of the piece

parts of their present variant. In 1985, the contract was awarded to the low bidder, Olympic Controls Inc., at a price of \$13,800 each. The Competition Advocate claimed a savings of approximately \$4 million on this procurement, but this case would quickly deteriorate into a major fiasco.

To date, Olympic is yet to deliver a satisfactory calibrator. Repeated FAT submissions have proven to be failures. The specification prescribes a Mean Time Between Failure (MTBF) of 1500 hours for this calibrator. The best time Olympic could achieve has been 3.2 hours. Since 1985 there have been no deliveries of new calibrators to the fleet customer. This has become a major readiness issue as the Navy has been forced to cannibalize, exist off repair of existing units, and circumvent the supply system with direct purchases from King. Due to this degenerating situation, SPCC has recently solicited an exigency buy to King for a quantity of 53 of the original calibrators. This award has not yet been finalized, but it is reasonable to assume that this emergency buy will cost at least 100 percent more than the original bid prices when the factors of lower quantity, inflation and exigency are considered.

Table IV displays the cost comparisons, especially the revealing hidden costs, for this account. The far left column of figures shows an approximation of what the Navy would have spent on the original configuration of King calibrators, under sole source conditions, and includes the attrition demand and new installations that would have been required from 1985 through 1991. This amount, \$1,305,090, is considerably less than the sum spent in the name of competition, which is displayed in the final two columns. Assuming that SPCC ever receives satisfactory calibrators from Olympic, the Navy will spend \$9,526,536 on a calibrator it did not need. Without appearing overly cynical, at least one more competition towards the command

TABLE IV
EXAMPLE #4- HIGH PRESSURE GAUGE CALIBRATOR

	SOLE SOURCE	COMPETITION	
HIDDEN COST CATEGORY	KING	KING	OLYMPIC
Unit Cost ¹	\$1,300,090	\$6,063,816	\$4,264,200
Provisioning		\$ 67,950	\$ 135,450
NSN Maintenance (450 parts-15 years)		\$ 362,812	\$1,088,437
Configuration Control		\$ 6,180	\$ 6,180
Technical Manuals		\$ 28,125	\$ 28,125
Planned Maintenance and Repair Specification		\$ 25,000	\$ 150,000
Training ²		\$ 702,216	\$ 674,000
Spares Support ³		\$ 400,000	\$1,000,000
Contract Administration	\$ 5,000	\$ 15,000	\$ 100,000
Exigency Buy ⁴			\$2,080,144
Totals	\$1,305,090	\$7,671,099	\$9,526,536

Source: Ships Parts Control Center Procurement History File and Naval Sea Logistics Center ILS Cost Algorithm (Mechanicsburg, PA: 13 December 1991) and Engineering Data from Naval Weapons Assessment Center (Corona, CA: 3 December 1991).

¹The sole source buy from King is the attrition demand and new requirements since 1985. This quantity is 53 each at 25% more than bid price which is the standard amount competition intends to save. The competitive unit cost totals use the bid prices for King and Olympic times a quantity of 309.

²This includes the cost to modify training courses and outfit the schools with the new calibrators.

³This is a conservative estimate to outfit wholesale and retail levels with spare parts.

⁴This represents 53 units purchased under exigency conditions from King at a price 100% above the King bid cost which accounts for inflation and exigency circumstances. This is a conservative estimate.

business plan goal was achieved. Even if one were to concede a need for a new calibrator, SPCC will spend \$1,855,437 more by making the competitive award to Olympic instead of King.³⁶

The economics of this case are quite clear, but there are even more tangible and intangible costs. There will be a requirement to support two versions of calibrators for years to come with all the associated duplication of training, repair, administration, and supply support. The lack of standardization will be frustrating to fleet and shore commands. A proliferation of 450 new Olympic stock numbers will not go far in satisfying concerned GAO auditors that the services are interested in reducing DOD stocks of material that quickly becomes inapplicable. Finally, the readiness impact on fleet operations and safety is considerable, engendering a concurrent loss of confidence in the supply system's ability to support material requirements.

Many more examples similar to the above can be provided from SPCC procurement files. They are not anomalies or anecdotal stories, but rather a broad sample of the degree to which hidden costs of competition can be accrued.

Counterarguments- Competition Benefits. There are many innate benefits of competition and a sensible acquisition strategy will attempt to maximize this advantage. When used under the right set of circumstances, such as when components are design stable and reprourement data is complete, competition can obtain the best price and value for the Navy. No other

³⁶Interviews, Phone Conversations and Engineering Data from Ships Parts Control Center Program and Procurement History Files, Timothy McCaw, SPCC Program Manager, Gauge Calibration Equipment, Mechanicsburg, PA: 14 December 1991 and William H. Hallman, Naval Weapons Assessment Center, Corona, CA: 3 December 1991.

strategy can better motivate industry to cut their costs of doing business and hence, the bid prices on SPCC contracts. Additionally, it can create a climate that incentivizes business to maximize efficiency and even enhance state-of-the-art development of products. Competition offers another prospective benefit in the growth of the industrial base for spare parts business.

A final competition benefit worthy of mention is related to the responsiveness of sole source manufacturers. This chapter has already made a strong point of emphasizing the risk of poor or non-performance by first-time competitors. This risk is real, and while sole source vendors normally deliver contracted material, they can also be slow to respond to requests for price quotations, non-responsive to Navy requests for engineering change proposals (ECPs) and troublesome in price negotiations. An example case is provided by the breakout of Oxygen Breathing Apparatus (OBAs) from the OEM, Mine Safety Appliance (MSA), to competition. Prior to breakout, MSA was notoriously sluggish in providing quotations, routinely overdue in delivery of material, and reluctant to implement ECPs. After MSA lost their first competitive award for OBAs the corporate attitude seemed to change. Consequently, MSA has won subsequent contracts and SPCC has benefitted through lower prices, faster deliveries and a more responsive contractor. It should be noted that in this example the OBA is a Navy design so the hidden costs of ILS were not a factor in the breakout.³⁷

The constructive benefits of competition just described should be as much of a consideration in an acquisition strategy as the costs of ILS or contract administration. Before moving to the final chapter of this study which will offer conclusions and recommendations for

³⁷Telephone conversation with Barbara Klaiber, Director, SPCC Hull, Mechanical and Electrical Contracting Division, Mechanicsburg, PA: 4 February 1992.

improving the use of competition in procurement of spare parts and components at SPCC, Chapter VI will advance the perspectives of some senior defense industry executives concerning the Navy's use of competitive acquisition strategies. Their views will counter some of the purported benefits of competition and the manner in which Navy procurement officials employ it.

CHAPTER VI

DEFENSE CONTRACTORS PERSPECTIVE ON COMPETITION

An Overview. The ideas in this chapter are derived from interviews with senior managers from some key defense industry companies that conduct significant spare parts business with the Navy. Specifically, many of the impressions contained herein come from discussions with the managers of companies that have long provided hull, mechanical and electrical (HM&E) equipment spare parts and components for SPCC contracts. The HM&E equipments have been the largest target of competition strategies since these commodities are more closely linked to commercial applications than components associated with combat systems. At a recent meeting of the American Marine Machinery Association, these senior industry executives expressed their views on both the benefits and costs of the competitive environment fostered by DOD. The concerns of these companies pertaining to the use of competition in the defense procurement business have been communicated to the House Armed Services Committee. A copy of this correspondence is included as Appendix V and forms the basis for the discussion in this chapter.

Business and Industrial Base Issues. As the DOD and Navy greatly expanded during the Reagan administration budget years, a larger portion of the Defense dollar was available to defense industries. The advent of competitive acquisition strategies certainly did not prevent the larger companies from reaping the benefits of a growth defense industry. However, as the Navy started to downsize in the late 1980s and continues to shrink at an even greater rate in the 1990s, many of the established defense companies are questioning whether competition is in the government's best interest. They absolutely do not find it benefiting their individual firms. One

of the purported benefits of competition is that it will expand the industrial base by creating more sources for Navy spare parts procurements. The manager of the Marine/Federal Products Group for IMO Industries Inc. refutes this belief when he states,

"As the Navy continues to compete the business of spare parts and components, they slowly take away the business from the larger, established companies; often for small, short-term savings. Most of the established HM&E companies are smaller subsidiaries of larger parent companies as exemplified by Warren Pumps Inc. a division of IMO Industries Inc. Once the percentage the subsidiary contributes to the parent company declines to the 5 to 10 percent range, the affiliate becomes a key target for sell-off or dissolution. The 'burden rate' or overhead to do business with the Navy is much higher than commercial business and the parent companies are starting to view Navy business as a liability. This is the point at which most of the HM&E companies stand at this time. The Navy will certainly sustain significant long term disadvantages in terms of existing equipment support, future research and development capabilities, and even detrimental effects on the industrial base."³⁸

A significant example of the above is found in the 1988 decision by General Electric to get out of the small motor business because of some of the reasons cited above. The Navy has experienced significant problems with GE's decision as the "competition" could not fill the void. In essence, although it may appear that one of the benefits of competition should be expanding the industrial base for spare parts, in fact the opposite consequence can be the result.

Research and Development/Innovation Issues. One of the widely held tenets of competition is that it will create a "hotbed" of innovation and technology improvements. This advantage of a competitive environment can not be ignored, especially in the acquisition of major systems, but many of the competitive procurements for spare parts are no more than finding a second source to duplicate a proven product. The companies that win these types of

³⁸Interview with Larry J. Holley, Manager, Federal/Marine Products Group, IMO Industries Inc., Washington, DC: 14 January 1991

competitive bids are often small businesses that do not have the overhead for engineering and quality support that the larger firms must sustain.³⁹ On the face of things this certainly sounds like a beneficial and economic way of procuring these types of parts requirements, but referring back to the previous paragraph, as you drain the business away from the original manufacturers they may go out of the business. Even if they do not exit the business, they will certainly be reluctant to make the capital investment in R&D and product improvement in an uncertain competitive environment in which the Navy will award a contract to a small business that often underbids them by a small margin. At this point, when the Navy needs a company to develop the next generation of pump, propulsion system or laser weapon system, the expertise no longer exists to perform this function. For example, the Navy just developed, in conjunction with Worthington Pumps Division of Dresser Industries, the design and production of a titanium fire pump that is on the cutting edge of pump technology and currently being installed in the latest versions of the Nimitz class aircraft carrier. A spare parts and components industry composed of small machine shops and other reverse-engineering replicators could never support this type of innovative research and development nor will they have the incentive to improve quality of spare parts. Taking a long-term, TQM/L view of this issue, there are significant advantages to developing solid, enduring relationships with dependable defense industry companies vice an unreasonable spreading of the business that does not provide long-term benefits. The question that the knowledgeable reader would ask at this point would be how does the government ensure price reasonableness under such a scenario? This issue will be addressed next.

³⁹Interview with James Fromfield, Vice President, Leslie Controls Inc and President, Marine Machinery Association, Washington, DC: 14 January 1991.

The Cost of Long-Term Relationships. The Norfolk Price-fighter data presented in Chapter III somewhat dispelled the notion that prior to competition the Navy was a victim of overpriced spare parts and components on a significant percentage of its contracts. Recalling that from fiscal year 1986 to 1991, Price-fighters has found only around 4 percent of SPCC contract awards to be overpriced, this problem certainly was not of the magnitude that press reports have indicated. Assuming, however, that it is a problem that should not be ignored, many audit controls have been put into place since the early 1980s that deter defense contractors from over-charging the Navy.

The Defense Contract Audit Agency (DCAA) is charged with ensuring that the government is on the receiving end of fair prices for contracted material. Pre-award audits are conducted on companies to ensure that bids are reasonable. For contracts greater than \$100,000, businesses are required to submit an SF-1411 which is a complete disclosure of costs to include labor rates, material and overhead applied. At this point there is often negotiation between DCAA and industry on cost and the government even decides what a reasonable profit percentage should be, depending on the commodity. The audit process does not end here as post-award spot checks are made to ensure contractors are adhering to agreed-upon cost figures.

The stringent audit procedures described above were another government response to the perceived over-pricing "problem" in the early 1980s. The defense contractors do not particularly mind the audit process as they will legitimately add the costs of compliance to overhead, but they do question the process from a taxpayer perspective. If competition in procurement was designed to get the government a best price for spare parts then why do we need the degree of audit and oversight currently in place. This is precisely the type of anti-TQM process that

should be avoided. Larry J. Holley of Warren Pumps describes the situation as follows:

"Prior to the 1980s we would see defense auditors perhaps twice a year. Now we have DCAA auditors on site on a weekly basis. We have even set up an office at our plant for their use. Our profit margins are not much different now then they were prior to this oversight. It does not make sense that we go through the competitive bid process, win an award, and then enter an exhaustive audit process. In the end the Navy and ultimately the taxpayer pays all these costs."⁴⁰

To summarize the issue of fair prices, the DCAA audit procedures guarantee that the government will get a fair price, as should the forces of competition, but applying both strategies is a faulty business practice for the Navy. The concerns over establishing long-term relationships with sole source defense contractors can be allayed by maintaining a strong audit function, but the evidence from Price-fighters and the insight of senior defense industry executives would seem to question whether even the current level of audit is required.

Quality Issues. The previous chapter briefly discussed the issue of how competition has influenced the quality of products received and came to the conclusion that current studies were inconclusive and this matter needs further research beyond the scope of this paper. Since previous studies have been based on Quality Deficient Report (QDR) data, defense industry executives question the validity of this research. Their experience has shown that most of the submitted QDRs are for what they define as software problems such as paperwork deficiencies or packaging problems.⁴¹ These types of QDRs tend to also concentrate on the larger defense contractors where the degree of audit and inspection is higher. The smaller business concerns

⁴⁰Interview with Larry J. Holley, Manager, Federal/Marine Products Group, Warren Pumps Inc., Washington, DC: 14 January 1992

⁴¹Interviews with the Executive Board of the American Marine Machinery Association (MMA), Washington, DC: 14 January 1992.

tend to avoid this kind of scrutiny as a majority of their contracts are lower dollar value or inspected at destination. Additionally, an historical problem with the QDR system is that the process is administratively tedious for the fleet customers, so the tendency is to simply discard the quality deficient part, order a replacement, and avoid the documentation. The result is that the QDR tends to document issues like having too many nails in a packaging container vice actual hardware problems with spare parts. Any future study that attempts to analyze the effects of competition on quality must deal with these issues as the concerns of defense industry are worthy of consideration.

As a final comment on this issue, no definitive conclusion can be reached on how competition has impacted the broad spectrum of quality of spares and its resultant effect on Navy readiness, but a number of competition horror stories seem to support the need for future research of this topic. A bureaucracy was developed called the Diesel Spare Parts Improvement Program at the Naval Sea Logistics Center largely to correct many quality problems acquired as a result of the competitive breakout of diesel spare parts. Finally, defense industry directors question the wisdom of awarding contracts for critical spare parts to the lowest bidder when the items may have a crucial safety or mission essential application. This goes back to one of the major differences between the defense and commercial markets as the Navy is buying many products to counter a threat or fight wars and is not simply profit oriented. Again, these issues are worthy of discussion, but need further examination beyond this report.

Summarizing Defense Industry Perspective. On the face of it, the motives behind some of the defense industry perspectives contained in this chapter must be considered. They view the shrinking defense market with intense concern and the implementation of competitive

acquisition strategies has only exacerbated their problems. Regardless, their views concerning threats to the industrial base for spare parts and future component development, DCAA audit procedures, and the possible impacts on quality and readiness are absolutely on target. Further, as the Navy spare parts business is downsized by Defense cuts and dispersed among low bidding competitors, the degree of influence that Navy contracts have on the larger manufacturers will be significantly diluted. This lessening of influence will affect the degree of concern the major companies will express towards Navy business. These issues need to be considered both within the context of competitive acquisition and the larger framework of how the Navy and DOD will conduct it's future spare parts procurements in a contracting defense market.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

Conclusions. This study has demonstrated that the procurement scandals of the early 1980's bred a mentality and programs that made competition an end and not a means to improving the acquisition of spare parts and components. The pointed comment of the SPCC program manager who said, "We will attempt to save money through competition no matter how much it costs us", truly epitomizes the climate set by the various programs, bureaucracies and goals established in the name of pursuing competition. On the positive side of the ledger, significant progress was made in changing the attitude of procurement personnel in terms of viewing sole source procurements as the low-risk, path of least resistance, thus foregoing the legitimate benefits of competition. Additionally, notable cost savings were achieved in breaking out spare part business from prime contractors and in competing items that were either Navy designed or for which solid data packages existed. Notwithstanding these advantages, the competition pendulum swung too far. Data from the Price-fighters organization revealed that the highly publicized overpricing sensation was overplayed. Numerous examples throughout this narrative have established that the short term cost savings figures reported through competition are severely overstated when the long term, hidden costs are considered.

This analysis has clearly portrayed the business environment of DOD/SPCC to be markedly dissimilar to that of the commercial market. To compare the potential and real effects of competition in these widely differing sectors can induce faulty business decisions. Nothing more succinctly illustrated this point than the figure that depicted the challenges and conflicting

objectives imposed on an SPCC contracting officer compared to their commercial counterpart and Appendix I, which displayed the distinct differences between the commercial and defense markets.

The manner in which SPCC approaches the use of competition as an acquisition strategy is in conflict with the principles of TQM/L. Specifically, the lack of customer focus, the setting of sub-optimal goals and quotas, barriers between departments, and awarding contracts primarily on price are all anti-TQM/L processes that hinder optimal business decisions at SPCC. The perspective of defense contractors echoed many of the TQM/L sentiments, particularly their desire to develop long-term relationships with the Navy that are beneficial to both Defense and industry in terms of maintaining quality products, research and development capabilities, and a solid Navy industrial base.

The prevailing environment described above has set the stage for accumulating huge hidden costs associated with competitive buys. It starts with the faulty competition algorithm that decides how an item should be procured and continues with the actual competitive award when the obscured costs of ILS, procurement lead time delays, contract administration and exigency buys are acquired. Example cases provided in Chapter V revealed that these costs can range from hundreds to millions of dollars and that the Navy ILS costs to support new items of supply alone can reach well above this level. The purchase of high pressure gauge calibrators graphically portrayed how the zeal to compete an item cost SPCC and the Navy millions of dollars.

No acquisition strategy or "cookbook" will fit every procurement. The benefits of competition must be in consonance with sound, long-range business decisions. The spare parts

and components sensitive to ILS costs must be identified and considered early in the procurement process, especially on performance specification material. Of equal importance, the risk of non-performance by first-time competitive manufacturers must be reduced.

A final conclusion is that the Navy and SPCC need to develop an acquisition process that allows more intelligent and adaptable procurements. The cost factors of downstream ILS support, increased contract administration, and the risk of non-performance must be a key component and ingredient of the solicitation and award process when evaluating a competitive procurement. The Federal Acquisition Regulations (FAR) allow the discretion to make this happen and top DOD/Navy leadership have made clear statements that support this objective. Nonetheless, Navy leadership can not have it both ways since more flexibility implies the relaxing or elimination of constraints such as business plan goals for competition. Recommendations will now be offered to improve the process by which SPCC approaches competition in procurement.

Recommendations. If competitive acquisition strategies are to be employed intelligently, the process must start early in the spare parts reprocurement cycle. Two recommendations will enable this to occur. First, the competition/breakout algorithm must be improved. Principally in the case of performance specification items, it needs to be more responsive to the hidden costs described in Chapter V. This overhaul of the algorithm must include a more legitimate accounting of ILS costs, contract administration costs, costs of inventory investment due to extending procurement lead times, and the increased risk associated with first-time, competitive contracts. A more efficient, up-front estimate of these costs will significantly reduce the prospect of developing procurement cases similar to the examples provided in Chapter V.

Additionally, the manner in which the model uses a blanket 25 percent savings figure and pre-determined annual buy value cut-offs does not give the algorithm enough elasticity to make proper, long term, procurement strategy decisions. The 25 percent value should be analyzed so as to determine the degree to which it is commodity sensitive and modified accordingly. Further, since annual demand estimates can be extremely variable, part of the pre-solicitation procurement strategy should include a re-evaluation of the potential savings from competition based on the most current requirements and demand forecasts.

A second, up-front recommendation is that the spare parts and components that are sensitive to the ILS costs outlined in Chapter V should be coded as ILS sensitive during the provisioning process. Again, this is especially true in the case of performance specification items. This function would be performed by the Hardware Systems Commands (HSCs) in the data provided to the Inventory Control Points (ICPs) such as SPCC. A perfect window for implementing this recommendation now exists since the program by which the HSCs transmit provisioning technical data, called Interactive Computer Aided Provisioning System (ICAPS), is now being updated. The addition of an ILS sensitivity code would allow SPCC to identify these types of components in an automated fashion and take the appropriate action to consider hidden costs in the procurement process.

Once the competition algorithm is made more efficient in the manner described above and ILS sensitive items can be identified, the SPCC requirements generation and contracting activities must develop the appropriate acquisition strategy for these types of items. This will not be an insignificant task and requires a TQM/L approach. First, the barriers between these organizations must be removed and procurements must be conceived from a customer's

perspective. The contracting codes at SPCC should be merged with the requirements divisions and co-located. This action will encourage cooperation and more easily allow the development of acquisition strategies for ILS sensitive procurements. A second TQM/L-inspired recommendation is to eliminate the inefficient goals for competition and small business awards. This will require action by the Naval Supply Systems Command and, perhaps, changes to law. For example, the practice of excluding large businesses from potential competitions or awards when two or more responsible small businesses (less than 500 employees) are able to compete is a practice that often creates hidden costs and quality problems. Likewise, the goals for percentage and dollar value of competitive award should be eliminated. Realizing that changing law can be politically difficult, the Navy at least has some control over goal-setting for its procurement activities.

A key to avoiding the hidden costs of competition lies in structuring contract solicitations that will consider the costs of ILS and contract administration in the award decision. To be successful in this endeavor the measures used to calculate these hidden costs must be auditable and maintainable. For example, NAVSEA has employed ILS factors in awarding contracts, but their algorithm is not current; the cost to maintain stock numbers is based on a 1981 study. Unless the factors are auditable and current the award decision will not stand up to the scrutiny of a contractor protest. It is recommended that NAVSUP, in conjunction with NAVSEA, develop a current, auditable model to be used in calculating the hidden costs of ILS and contract administration; a set of factors that can then be used by procurement activities. Once this is accomplished, the hidden costs can be made a factor in the solicitation and award decision. Some sample contract clauses are provided in Appendix IV. There is strong reason to believe

that using these factors in award decisions will be highly successful since similar efforts have been effective in using quality, a much more difficult attribute to quantify, as an award criteria. The Red-Yellow-Green program, used by SPCC to evaluate contractor quality in Level 1-Subsafe procurements, has a strong impact on the contract award process.

The next recommendation is made to help reduce the risk to the Navy on contracts involving first-time competitors. Some teeth must be put into the pre-award survey process. Currently, the average pre-award survey costs \$500 which does not provide much more than a cursory look at a company's ability to perform. The high number of contract terminations and other contractual problems from competition breakouts also attests to this failing. Obviously, the effort to make this process effective will be costly in terms of resources and personnel. Instead of plowing such an incredibly high degree of resources into the cost auditing function, why not use this money more effectively before contracts are awarded? The comments of defense industry executives regarding the ever-increasing amount of needless cost audits by government contract administration personnel would seem to indicate that the resources could be better applied to the pre-award process and thereby arrest the types of post-award costs accrued in cases like Table III in Chapter V.

Another recommendation involves making better use of more long-term contracting tools such as option quantities. This particularly applies to high demand items that will be procured over a long term basis. If a company has been a proven performer then that performance should be rewarded with future business. The ability to exercise an option to buy additional amounts of a component reduces contract administration and virtually eliminates the risk of non-performance. Again, this recommendation may require NAVSUP support to give procurement

officials the latitude to use this type of creative contracting. Currently, market surveys are often required to determine if a lower competitive price could be achieved before exercising options. This requirement is a sub-optimal business practice.

The lessons-learned and recommendations of this study should be applied to not only current competitive procedures, but also to future business. One of the Defense Management Review Decisions (DRMDs) requires the Navy to compete 30 percent of the repair business for depot level repairables (DLRs) by fiscal year 1995. Of the current \$263 million in SPCC repair business, only \$5 million, or 2 percent, is now competed.⁴² Unless the hidden cost lessons from spares procurements are employed, tremendous resources will be unnecessarily wasted on competitive repair. Additionally, a host of new costs will arise in the area of DLR carcass tracking and the expense of buying or developing technical repair standards.

A final recommendation is submitted in order to implement the aforementioned actions. An SPCC TQM/L Process Action Team (PAT) should be assigned to set in motion the recommendations offered in this chapter. This team should be comprised of personnel from all the concerned disciplines at SPCC, to include inventory managers, reprocurement technicians, buyers, and contract administrators. The potential to save considerable short and long term financial resources, and to better serve the Navy customer is manifest.

⁴²Interview with Hiram Caulkins, Director, SPCC Repair Operations Division, Mechanicsburg, PA: 14 December 1991.

APPENDIX I

Some Examples of "Market Imperfections and Failures" in Defense

Free-Market Theory

Many small buyers.

Many small suppliers

All items small, perfectly divisible, and in large quantities.

Market sets prices.

Free movement in and out of market.

Prices set by marginal costs.

Prices set by marginal utility.

Prices fall with reduced demand.

Supply adjusts to demand.

Labor highly mobile.

Decreasing or constant returns to scale.

Market shifts rapidly to changes in supply and demand.

Defense Market

One buyer (DOD).

Very few, large suppliers of a given item.

One ship built every few years for hundreds of millions of dollars each.

Monopoly or oligopoly pricing- or "buy in" to "available" dollars.

Extensive barriers to entry and exit.

Prices proportional to total costs.

Any price paid for the desired military performance.

Prices rise with reduced demand.

Large excess capacity.

Greatly diminishing labor mobility.

Increasing returns to scale in region of interest.

7-10 years to develop a new system, then 3-5 years to produce it.

Source: Jacques S. Gansler, The Defense Industry, 1984, pp. 30-31.

Competition is for share of market.

Production is for inventory.

Size of market established by the buyers and sellers.

Demand sensitive to price.

Equal technology throughout industry.

Relatively stable, multiyear commitments.

Benefits of the purchase go to the buyer.

Buyer has the choice of spending now or saving for a later purchase.

Competition is frequently for all or none of a given market.

Production occurs after sale is made.

Size of market established by "third party" (Congress) through annual budget.

Demand "threat" -sensitive, or responds to availability of new technology; almost never price-sensitive.

Competitive technologies.

Annual commitments, with frequent changes.

A "public good."

DOD must spend its annual congressional authorization.

Source: Jacques S. Gansler, The Defense Industry, 1984, pp. 30-31.



The evaluation factor will be computed on the basis of current variable values related to the most conservative currently used equipment which is being considered for competitive reprocurement to a performance specification. Recomputation of the evaluation factor will be permitted for any bidder who provides actual variable values relevant to their offered equipment as described in the following evaluation factor computation analysis.

The evaluation factor will be computed by summing the values related to seven ILS variables which result in additional costs to the Government when a new equipment design is introduced into the Navy inventory. Values for each of the ILS variables will be computed separately with explicit conditions defining application of the resultant value to the total contract evaluation factor. Each of the variables, the conditions for application, and the required no cost data necessary for recomputation are:

A. Cost of Provisioning:

$$C_p = 450 + 300(NPN) + 75(PN) \quad [1]$$

where: C_p = Cost of Provisioning
NPN = Number of Parts Representing New Items of Supply
PN = Number of Parts Currently in the Supply System

Since on an average of 25% of all parts in an HM&E equipment provisioning project represent new items of supply and 15% of all parts in an electronics equipment provisioning project represent new items of supply, equation [1] is reduced to the following:

$$C_p = 450 + 131.25(P) \quad (\text{for HM\&E}) \quad [1A]$$

$$C_p = 450 + 108.75(P) \quad (\text{for Electronics}) \quad [1B]$$

where: P = the number of different maintenance significant parts in the equipment

Conditions for application:

1. The equipment being offered to the Government represents a new design to the Navy.

Data Requirements for Recomputation:

1. A complete parts list for the equipment being offered.
2. A DLSC screen of all parts for the equipment being offered.

B. NSN/APL Maintenance Costs:

The cost of maintenance of a stock number in the supply system is \$448 per year; therefore:

Source: Naval Sea Logistics Center, Evaluation Factor Computation Analysis, Mechanicsburg, PA: December 1991.




$$C_m = 448(NP)(L) \quad [2]$$

where: C_m = Cost of NSN maintenance
NP = Number of New Items of Supply
L = Projected life of the equipment in years

As in [1], equation [2] can be reduced to:

$$C_m = 448(.25)(P)(L) \quad (\text{for HM\&E}) \quad [2A]$$

$$C_m = 448(.15)(P)(L) \quad (\text{for Electronics}) \quad [2B]$$

where P = Number of different parts in the equipment

Conditions for application:

1. Same as A.

Data Requirements for Recomputation:

1. Same as A.

C. Cost of Training:

The cost to develop and maintain training for a new equipment is given by the following equation:

$$C_t = PR(L-2) \quad [3]$$

where: C_t = Training Cost
PR = Unit Price of the Equipment
L = Life of the equipment being procured

Conditions for application:


1. Same as A.
2. The Government must document the need for training. This may be accomplished by identification of a currently existing organic training curriculum for the equipment being competed.

Data Requirements for Recomputation:

1. Price data for the equipment being offered.
2. Objective documentation to substantiate reductions in training requirements of the lack of need for training.

D. Cost of Technical Manuals:

The cost to the Government to prepare technical manuals is given by the following:


$$C_{TM} = 62.5(P)$$

[4]

where: C_{TM} = Technical Manual Cost
P = Number of Parts in the equipment

Conditions for application:

1. Same as A.
2. Delivery of a suitable technical manual is not required by the contract.

Data Requirements for Recomputation:

1. A complete parts list for the equipment being offered.

E. Cost of Installation Drawing Changes:

The cost for revisions to installation drawings is given by:

$$C_d = \$1000(CL) \quad [5]$$

where: C_d = Cost of Installation Drawing Changes
CL = Number of Ship Classes Receiving equipment.
(One if installations are not identified)

Conditions for application:

1. Same as A.
2. Identification by the government of the need for installation drawings. This may be accomplished by identification of an existing installation drawing(s) for the equipment being competed.

Data Requirements for Recomputation:

1. This variable is not subject to recomputation.

F. Cost of Configuration Control:

The cost to process configuration control records is given as:

$$C_{CC} = 20(POP) \quad [6]$$

where: C_{CC} = Cost of Configuration Control
POP = Number of equipments being procured

Conditions for application:

1. Same as A.





Data Requirements for Recomputation:

1. This variable is not subject to recomputation.

G. Cost of Planned Maintenance:

The cost to revise planned maintenance documentation is given as:

$$C_{pm} = \$500 \quad [7]$$

where: C_{pm} = Cost associated with PMS

Conditions for application:

1. Same as A.
2. The Government must identify a need for PMS. This may be accomplished by identification of existing MRC(s) for the equipment being competed.

Data Requirements for Recomputation:

1. Documentation to support the lack of need for PMS. For example, improvements in technology or simplifications in design may eliminate the need for PMS.

The contract evaluation factor is developed by summing the relevant individual variables values discussed above. This factor will be based on documentable values associated with the currently installed equipments unless recomputation based on no cost data provided by the bidder results in a lesser evaluation factor, in which case this lesser value will be used.

ILS Variable	Value Computed based on Competed Equipment	Recomputation Value based on Bidder No Cost Data
A. Cost of Provisioning		
B. NSN/APL Maintenance		
C. Cost of Training		
D. Cost of Technical Manuals		
E. Cost of Installation Drawings		
F. Cost of Configuration Control		
G. Cost of Planned Maintenance		

Contract Evaluation Factor



Competed Equipment NSN _____
 Number of Parts _____
 Number of New Parts _____
 Unit Price (B053) _____
 Expected Life (yrs) _____
 Number of Ship Classes _____
 Procurement POP _____

APL _____

ILS Variable	Applicable	Value Computed Based on Competed Equip	Recomputation Value Based on Bidder, No Cost Data
A. Cost of Provisioning			
B. NSN/APL Maintenance			
C. Cost of Training			
D. Cost of Tech Manuals			
E. Cost of Installation Drawings			
F. Cost of Configuration Control			
G. Cost of Planned Maintenance			
Contract Evaluation Factor			



APPENDIX III

CONTRACT ADMINISTRATION COSTS

<u>Event</u>	<u>Total Cost/Event</u>
1. Pre-Award Survey	
A. DCAS- Quality Survey	\$ 500
B. With procurement representative	
(1) Local	\$ 775
(2) Intermediate	\$1,380
(3) Distant	\$2,095
2. Post-Award Orientation Conference	
A. DCAS- Quality	\$ 550
B. With procurement representative	
(1) Local	\$1,075
(2) Intermediate	\$2,110
(3) Distant	\$3,590
3. Product Oriented Survey- Procurement Representative with DCAS participation	
(1) Local	\$ 800
(2) Intermediate	\$1,500
(3) Distant	\$2,215
4. Government Source Inspection	\$ 500
5. Receipt Inspection at Source- Navy representative with DCAS participation	
(1) Local	\$ 650
(2) Intermediate	\$1,360
(3) Distant	\$2,182
6. Receipt Inspection at Destination- Navy representative	
(1) Local	\$ 597
(2) Intermediate	\$1,194
(3) Distant	\$2,332
7. First Article Test (FAT)	\$ 500
8. Quality Assurance Letter of Instruction	\$ 755
9. Purchase Referrals	\$ 640

Note: These are average costs and can vary widely with each procurement.

Source: Naval Sea Systems Command Detachment, Naval Material Quality Assessment Office, Technical Evaluation Adjustments, Portsmouth, NH: January 1992.

PROPOSED CONTRACT CLAUSE

1. The item under procurement represents an item of equipment procured to performance specifications which is provisioned by the US Navy to develop repair part support for intra-Navy repair through the life cycle of the equipment.
2. An Integrated Logistic Support (ILS) factor will be added to the bid price by SPCC for all offers which represent new equipment configuration entities not currently in US Navy inventory or under contract for US Navy inventory. This factor represents a conservative estimate of costs which the US Navy will incur as a result of introduction of a new equipment configuration. The sum of this factor and the bid price will determine the low bidder.

The evaluation factor has been computed based upon the cost to provision a new equipment configuration entity and the cost to maintain the new national stock numbers (NSNs) resulting from this provisioning effort over the life cycle of the new equipment configuration entity life cycle. For this solicitation the evaluation factor is _____ and is based upon an average of _____ NSNs selected as repair parts to support equipment configurations previously acquired utilizing this specification.

3. All bidders must provide the following information for ILS cost/evaluation factor computations:

- a. The exact identification of the configuration entity proposed to be furnished in response to this solicitation (e.g., Model number/Certification Data Sheet reference/drawing number). (Note: this must be an exact configuration identifying number.)





b. The last contract under which this equipment was supplied to the US Navy.

c. Where the equipment has not been previously supplied to the US Navy, the bidder will supply a complete repair parts listing and each repair part will be identified by the bidder to an existing NSN where an NSN exists. Failure to comply will result in computation of the factor by SPCC which assumes the average number of repair parts for this type equipment and that all repair parts are non-NSN'd. This may result in an excessively high factor additive to the bid price.

4. The award will be made on the basis of price and other factors.





EVALUATION FACTOR FOR INTEGRATED LOGISTICS SUPPORT

(a) "Old equipment," as used in this clause, means equipment currently in the Navy inventory.

"New equipment," as used in this clause, means equipment not currently in the Navy inventory. A different model or configuration of "old equipment" shall be deemed to be "new equipment."

"Integrated logistics-support (ILS) evaluation factor," as used in this clause, means the cost of introducing "new equipment" into the Navy inventory and provisioning and maintaining it throughout its service life.

(b) An ILS evaluation factor of \$ _____ will be added to each offer of "new equipment" under this solicitation.

(c) The ILS evaluation factor will not be added to offers of "old equipment." If an offeror intends to furnish "old equipment" hereunder, the offeror shall identify that equipment in the space below:

Manufacturer

Model/Drawing No.

APL No.*

(d) If an offeror of "old equipment" is awarded a contract under this solicitation, the offeror agrees to deliver to the Government "old equipment" identical to that upon which its offer was based.

★



**MARINE MACHINERY
ASSOCIATION**

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February 19, 1992

**Statement of the
MARINE MACHINERY ASSOCIATION
Before the
House Armed Services Committee
Panel on the
Structure of the U.S. Defense Industrial Base**

Mr. Chairman and Members of the Panel:

The Marine Machinery Association is the trade association of the manufacturers of the hull, mechanical and electrical machinery and equipment which goes into our Navy's ships and is used as well on commercial ships. Our members, together with the electronics and weapons system manufacturers, comprise the bulk of the industrial base which produces the materials that shipyards assemble into ships. This industrial base is larger in number of companies and in number of employees than the shipyards themselves, and operates at the highest technological levels. The manufacture of a pump is a far more technologically complex function than bolting it into place in a ship under construction.

The principal issue our industry would like to see this Panel of the Armed Services Committee address is the preservation of our country's ability to produce ships for the Navy. Other issues, such as the preservation and allocation of jobs for the idled shipyard workers should be placed in perspective and viewed in the light of what is necessary for the nation's defense.

As our Navy's need for new ships decreases and the industrial base that produces these ships is necessarily downsized, we should carefully determine which elements of that industrial base should be preserved. It cannot be assumed that market forces will work to preserve the highest quality producers because the industry, having many suppliers and but one customer, doesn't operate in a free market economy. What might well occur if the shrinkage is unattended is not the survival of the best but of the fortuitous.

Recent statements from the Department of Defense seem to imply that our shipbuilding industrial base is less susceptible to shutdowns because the units of the base are shipyards and manufacturing facilities that are divisions or subsidiaries of big corporations. It is true that most of the building yards that assemble warships are parts of large diversified corporations, and the same is so of many of the plants that manufacture the materials from which the Navy's ships are

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*Quality &
Ethics*



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made. It must be borne in mind, however, that the leaders of these diversified companies are no more able to keep a money losing division or subsidiary in existence than are the owners of free standing businesses.

Much has been said lately about "prototyping," which seems to mean contracting for the design of prototypes which are then put on the shelf. Later, if and when copies are needed, the product is sent to the shop for manufacture. What will likely result is the growth of an industry which designs theoretical machines divorced from the technology of production. And this at a time when "concurrent engineering"--the development of a product by cooperation between the engineers of the design department with the manufacturing experts of the shop--is becoming recognized as highly desirable.

The major part of the machinery and equipment made by our industry comes from companies that have integrated design and manufacturing. Our manufacturers have research scientists and design engineers whose function is to design marine products for the shop floor to make, and the scientists, designers and manufacturers work together in product development and improvement. They form a team of long experience with each other, with their products, and with the extremely hostile and specialized seawater environment within which their products must perform.

The separation of design and manufacture is widely recognized as undesirable, and nowhere more so than in the marine industry. The best result is achieved when a new product is designed by the producer of that type of product, manufactured in that producer's shop and then put into use by the customer. Thereafter, the producer and the user work together throughout the life of the product to keep it operating properly and to learn how to make the next product better. Simply stated, better products result when experience is gained and then utilized in designing, making and using them.

It need hardly be said that having a military force in existence and ready to meet the needs of our country is important militarily and politically. We cannot count on having a carrier/troopship the size and location of Saudi Arabia available for the next world crisis. Neither can we count on having six months to build up the necessary force and move it to the critical location.

In addition to keeping the force in existence, that force must operate and train to keep its abilities alive. This of course must be regular and ongoing activity as it has always been. Pilots behind desks and submariners on the beach lose their skills in proportion to the time those skills lie unused.

And so it is with industry. Shop floor workers, engineers, and executives lose their skills when they go idle. But even worse, idle manufacturing capacity is soon eliminated in our economic system. No company will keep its shipyard mothballed, nor will any manufacturing company keep its marine machinery capabilities in existence if it has no business. If the shop

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has no business to do it will be sold or dismantled and the property converted to some profitable use. This loss of marine manufacturing facilities and people will not be easily or quickly rebuilt.

Thus, it should be clear that our Navy should not fail to keep its shipbuilding industrial base, however much reduced in size, alive, prosperous and well, functioning on a continuous basis to produce what is needed to meet the Navy's obligations.

It is hard to believe that anyone will come up with a way of doing this using the methods of military acquisition in existence. Hasn't the time come to reorder the way the military acquires its goods and services?

Our marine manufacturers deal with their suppliers with this question foremost in their minds: "What is in the best interest of my company and its customers." They form and maintain relationships with their suppliers to get from them what is needed to fulfill their customers' requirements. They have little else in mind in that relationship.

Every successful manufacturer works to maintain the health, viability and availability of its supplier base. No one has the right to do business with them, and the low bidder has no exalted status. Neither is the concept of competition raised to the level of unquestioned religious dogma. The question is not "do we have competition," but are we getting what is in our best interest. The issue is not "are we getting the lowest possible price," but are we getting what is in our best interest.

The time has come for the military to take the same attitude and do its business the same way. Our Navy should sensibly shrink its fleet to the level required to meet its obligations, and it should sensibly shrink its industrial base to meet its needs. By this we mean that the Navy should choose which yards and which manufacturers are going to stay as members of the Navy's quality shipbuilding industrial base, and it should do so with the goal of maintaining the best facilities to meet its needs.

Throughout the shrinkage of the shipbuilding industrial base that has been going on for the past decades, many have looked to the possibility of a revival of commercial shipbuilding to provide a level of business to keep the yards and the underlying supplier base alive.

The worldwide shipbuilding industry is alive and well at the moment and the amount of business to be done in that industry in the coming decade shows signs of growing. Yet, American industry is not participating in what business is going on and shows no signs of being an awakening participant in the market. Right now only one large merchant ship is being constructed in a U.S. yard, a 21,000 ton containership. It is being built to a Danish design using primarily foreign machinery: a Japanese diesel main engine, Norwegian steering gear, a Finnish diesel generator, and a German propeller. Something ought to be done and done quickly to see if government action in the commercial shipbuilding market can be effective in reviving our American industry as an effective world competitor.

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If the presently contemplated acquisition of sealift ships were carefully planned to produce a long range benefit to the shipbuilding industry at every level, it could serve as a spark to the survival of more of the industry than will result from even well-conducted military acquisition policies. If the sealift acquisition program had as its goal to effect the manufacture of a number of American designed and built ships to compete in the world market, there would be the chance that one or more competitive products would result. The point is not to build the troopships and cargo ships the military would seek if allowed to contract for purpose built ships, but to build the kind of ships we chartered to do much of the sealift in the Gulf War—most of which were operating profitably in the world shipping trade.

This is not to say that the shipbuilding industry will reach this end automatically. Care must be taken to guide the development of the ships with the end in sight of having competitive, marketable American ships for the world shipping market.

The argument presented here is that for the shipbuilding industry, business as usual won't work in the critical times ahead. For the Government as well, doing its acquisition business as usual won't work. The opportunity for a fundamental change in acquisition policy has arrived. It would be wrong to fail to take advantage of that opportunity to produce a fleet that meets our needs and a healthy industry to support it.

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